PB-230 546

POLLUTION OF THE INTERSTATE WATERS OF THE GRAND CALUMET RIVER, LITTLE CALUMET RIVER, CALUMET RIVER, WOLF LAKE, LAKE MICHIGAN AND THEIR TRIBUTARIES. PROCEEDINGS OF CONFERENCE HELD AT CHICAGO, ILLINOIS ON MARCH 2-9, 1965.

VOLUME 3

Public Health Service
Washington, D. C.

9 March 1965

DISTRIBUTED BY:
NTIS
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 230 546

603

UNITED STATES DEPARTMENT
OF
HEALTH, EDUCATION, AND WELFARE

****

Conference in the matter of pollution of the interstate waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries (Indiana-Illinois).

****

MR. MURRAY STEIN, Chairman

****

McCormick Place
Banquet Room
9:45 o'clock a.m.
March 4, 1965
Chicago, Illinois

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

CONFEREES:

MR. H. W. POSTON,

Department of Health, Education, and Welfare,
U. S. Public Health Service, Division of
Water Supply & Pollution Control,
Regional Program Director, Illinois

MR. BLUCHER A. POOLE, Technical Secretary, and
MR. PERRY MILLER,

Stream Pollution Control Board,
State Board of Health, Indiana.

MR. CLARENCE W. KLASSEN, Technical Secretary, and
MR. RICHARD NELLE,

State Sanitary Water Board, Department
of Public Health, Illinois.

MR. FRANK W. CHESROW, President, and
MR. GEORGE A. LANE,

The Metropolitan Sanitary District
of Greater Chicago, Illinois

INDEX

STATEMENTS:

MR. SAMUEL R. ROSEN, Deputy Attorney General, State of Indiana 606

MR. PERRY MILLER, Assistant Director, Division of Sanitary Engineering, Indiana State Board of Health 616
(continued on page 747)

DR. JOHN NICOSIA, Mayor, City of East Chicago, Indiana 830

MR. CORNEL A. LEAHU, Sanitary District Superintendent, City of East Chicago, Indiana 838
(continued on page 908)

MR. A. M. KATZ, Mayor, City of Gary, Indiana 909

MR. PERRY MILLER (continuing) 936

MR. GEORGE FORT, Chairman of the Board, Merrillville Conservancy District 945

MR. JOSEPH S. BAUM, Coordinator of Waste Disposal, Cities Service Oil Company 951

MR. JOHN M. DEVINS, Plant Manager, E. I. DuPont DeNemours & Company, East Chicago, Indiana 968

MR. A. J. SCHULER, Plant Engineer, U.S.S. Lead Refinery, Inc., East Chicago, Indiana 976

DR. GREGOIRE GUTZEIT, Senior Scientific Advisor, General American Transportation Corporation, East Chicago, Indiana 978

MR. RICHARD J. MAUTHE, Chief Plant Engineer, Blaw-Knox Company, East Chicago, Indiana 994

MR. R. L. SHANER, Regional Engineer, Linde Division of Union Carbide Corporation 998

MR. EDGAR D. KEIPER, JR., Manager, Mobil Oil Company, East Chicago, Indiana 1002

STATEMENTS:

MR. GEORGE A. BLAINE, Plant Manager, Sinclair Refining Company, East Chicago, Indiana 1010

PREPARED STATEMENTS:

MR. SAMUEL R. ROSEN, Deputy Attorney General, State of Indiana 616

MR. PERRY MILLER, Assistant Director, Division of Sanitary Engineering, Indiana State Board of Health. 624

REPORTS, TELEGRAMS, COMMUNICATIONS, ETC.,

REPORT ON TREATMENT PROCESS PRIOR TO DISCHARGE INTO THE WATERS OF THE GRAND CALUMET RIVER, LITTLE CALUMET RIVER, LAKE MICHIGAN, AND THEIR TRIBUTARIES, presented by DR. JOHN B. NICOSIA, Mayor, City of East Chicago, Indiana 844

Letter from AMERICAN STEEL FOUNDRIES, Transportation Equipment Division, presented by Mr. B. A. Poole 997

CHAIRMAN STEIN: May we reconvene?

At this point, we would like to call on Mr. Blucher Poole of Indiana.

Mr. Poole.

MR. POOLE: Mr. Chairman, fellow conferees, ladies and gentlemen: When Mr. Stein closed last evening, he said today would be Indiana day. I must admit that there were several times during the course of the day yesterday when it appeared to me that it was Indiana day.

(Laughter.)

I do want you all to know that Indiana recognizes that we have a mutual problem in the south end of Lake Michigan. We, too, are interested in maintaining a high quality of water.

The State of Indiana has only a small portion of the lake, but we do recognize its tremendous assets.

We also recognize our obligations to our neighbors in Illinois.

Today, we are going to tell you what has been done and what we are in the process of doing, and we believe, when the work is completed, the Little Calumet and the Grand Calumet at the points where they cross the state line will be in an acceptable condition.

Further, we believe that the trend which was shown rather graphically yesterday by the Chicago Water Department's presentation--we believe the trend in the south end of Lake Michigan will have been reversed.

Now, our presentation will consist of, first, two statements on behalf of the Indiana State Pollution Control Board, following which there will be statements on behalf of all of the municipalities and each industry in Indiana that maintains a separate outlet into any of the waters that are under consideration.

I hope you will bear with us. That is, we have asked the big, medium-sized and the small. Some of the statements in my judgment are by participants in this conference who have a rather infinitesimal part in the over-all problem.

We are going to start off with Mr. Samuel R. Rosen, Deputy Attorney General of the State of Indiana, who does the work for the Indiana Stream Pollution Control Board.

MR. ROSEN: Mr. Chairman Stein, distinguished conferees, ladies and gentlemen, I have been asked by way of orientation to present the legal background of the Stream Pollution Control Board in the State of Indiana.

The problem to a lawyer in presenting a legal background on any subject is the problem of avoiding the pitfalls of overemphasis on legalistic phraseology, and in turning out a legal brief rather than an understandable presentation for the nonlegally trained.

There was a recent cartoon in the New Yorker magazine, depicting two well-dressed gentlemen along side a stream, both observing the debris of bottles of Napoleon Brandy, the butts of Havana Corona cigars and empty cans of caviar and Foie Gras floating by. One of the gentlemen observing this remarked, "It may be polluted but at least it's pollution of a high order."

The observation of pollution started as early as 1856 in the leading case of Sloan against the State, cited in 8 Ind. 312.

One, Sloan, was convicted of causing a nuisance by pouring the slops of the Bates House, the leading Hotel in Indianapolis, into the street where it made offensive pools along the west side of Illinois Street.

Thereafter, an early statute defined a nuisance as "whatever is injurious to health, or indecent, or offensive to the senses, or an obstruction to the free use of property, so as essentially to interfere with the comfortable enjoyment of life or property."

In 1868 in the State against Taylor, cited in 29 Ind. 517, one, Taylor, was indicted for depositing domestic waste in a spring near a highway from which travelers were accumstomed to drink. The indictment was upheld as a public offense under the nuisance statute, which I have already outlined.

This is probably the first case in the State involving stream pollution. Thereafter, various statutes and amendments were made by the Acts of 1881, and continuously up to 1957 with additional ones pending before the Legislature.

The present law remains essentially the same as written by Chapter 214 of the Acts of 1943, although there have been important amendments in '45 and '57.

In essence, the present law creates a Stream Pollution Control Board of seven members who are comprised of the Secretary of the Indiana State Board of Health, the Director of the Department of Conservation and the Lieutenant Governor of the State of Indiana, all serving as ex-officio members of said Board. The remaining four members are appointed by the Governor for terms of four years, no more than two of which shall be of the same political party.

The Governor fills vacancies for unexpired terms and may remove any member for cause. Ex-officio members serve without pay, the other members of the Board shall be paid mileage and a per diem fee. The Act provides for six regular meetings per annum and the

Secretary of the State Board of Health shall designate a qualified sanitary engineer as technical secretary of the Stream Pollution Control Board, who is Blucher A. Poole, the Conferee today who represents the Stream Pollution Control Board.

The jurisdiction of the Board is to control and prevent pollution in the waters of the State of Indiana with any substance which is deleterious to the public health or to the prosecution of any industry or lawful occupation, or whereby any fish life or any beneficial animal or vegetable life may be destroyed, or the growth or propagation thereof prevented or injuriously affected.

The powers of the Board are widespread in that it may bring any appropriate action in law or in equity in the name of the State of Indiana. It may hold Administrative Hearings, issue orders to any person, corporation, municipal corporation, partnership or legal entity to acquire, construct, repair, alter or extend such plants as may be necessary for the disposal or treatment of organic and/or inorganic matter which is causing, or contributing to, or about to cause or contribute to a polluted condition of the waters of the State.

It has the power of sealing mines, oil and gas wells, brine wells or any other subterranean strata causing, contributing to or about to cause or contribute to a polluted condition of the waters of the State.

It has the right of reasonable inspection upon private or public property and may call upon any State officer, board, department, school, university or other state institution and the officers thereof for assistance.

It may determine what qualities and properties of water shall indicate a polluted condition.

Whenever the Board shall determine that any corporation, municipal corporation, association, partnership, person, or any other legal entity is violating the various provisions as outlined in the Act, there shall be an Administrative Hearing. Methods of serving notice and holding hearings and thereafter issuing orders and enforcing the same with rights of appeal to the parties against whom said Administrative Hearings are held, are all outlined in the Act.

Incidentally, the Administrative Adjudication and Court Review Act which is set forth in Burns has taken over the original Stream Pollution Control Act and is controlling as far as administrative hearings are concerned.

All plans and specifications for abatement or correction of any polluted condition must be approved by the Stream Pollution Control Board.

If the offenders be a municipal corporation, the Act provides the steps necessary for the payment of funds available for such purposes in construction, acquisition, improvement, equipment, custody, operation, repair and maintenance of any plant, machinery or works, or if there are insufficient funds, it provides the necessary funds shall be raised by the issuance of bonds, subject to the approval of the Indiana Tax Board.

It limits the use of these funds for specific purposes and provides for a penalty for any individual offender, or any member of a partnership or any officer or private corporation, association or other legal entity, or any mayor, councilman, or member of a board of public works and safety, or any municipal corporation, who fails or refuses to discharge any duty imposed upon him by this Act or by final order of the Stream Pollution Control Board, may be deemed guilty of a misdemeanor and upon conviction thereof, shall be fined not less than $25 and not more than $100 to which may be added imprisonment in the county jail for any period not to exceed 90 days.

It gives the Stream Pollution Control Board discretion to extend the time fixed in any final order and provides that any of the above persons or corporations as described in the above paragraphs, who do not comply with the order within the fixed time or within the time additionally granted, shall be subject to a penalty of $100 for each day that such polluted condition continues to exist after the time so fixed, or as additionally granted, which may be recovered in a civil suit brought in the name of the State of Indiana, which is in addition to the penalties outlined under the misdemeanor penalty.

It shall be the duty of the Attorney General to prosecute all actions for penalties under this Section, and all penalties so recovered shall be paid into the common school fund of the State.

In practice this Act has worked effectively. There are various suits pending against corporations and individuals which I will outline.

Since the inception of the laws of 1943, there have been some 232 separate matters involving municipalities or industries. The greatest majority have been concluded successfully without the necessity of resorting to court action, by ruling of the Board after an Administrative Hearing.

With the passage of years since 1943, the various matters have increased in number as have the problems of pollution.

For example, in 1964 there were 25 separate

Hearings scheduled with municipalities or corporations; 20 separate conferences held; 15 orders issued by the Board and three facilities were constructed in lieu of Hearings.

In projecting the probable Hearings and Conferences which will be held in this year of 1965, it appears certain that both the number of Hearings to be scheduled will be increased, as will the number of Conferences.

There are at least six separate matters pending in the courts of the State presently which involve either appeals from rulings of the Administrative Hearing by the Stream Pollution Control Board, or application by the State for enforcement of cease and desist orders.

We have yet to resort to the penalty provisions provided by the Act, asking for a conviction as misdemeanor offenders, or asking for financial penalties.

There is a close cooperation between the office of the Attorney General and the Stream Pollution Control Board, in passing on correspondence and attending conferences, and in preparation of all notices, as well as the conduct of Administrative Hearings. This includes the review of testimony and transcripts taken at the Hearings and, of course, all court actions are exclusively handled by the Attorney General's office.

In conclusion, it is significant to note that the highest court of our State has upheld the Stream Pollution Control Act in the following cases: Manner vs. Terre Haute, 163 N. E. (2nd) 577 and the City of Plymouth vs. Stream Pollution Control Board at 238 Ind. 439. Thus, we have had an effective law which is being administered in an effective manner. The Stream Pollution Control Board is affirmatively and agressively functioning. It is successfully waging the continuous war against water pollution. Thank you.

CHAIRMAN STEIN: Thank you, Mr. Rosen.

Are there any comments or questions?

MR. KLASSEN: Yes, I wanted to ask Mr. Rosen a question or two. From my own experience, I realize that the defeat or the success of a vigorous pollution control program is the action by the Attorney General, and I want to ask Mr. Rosen whether the Attorney General in Indiana has ever secured an injunction against a municipality or an industry prohibiting the discharge of wastes into a stream?

MR. ROSEN: This we have. I can give you the citation.

MR. KLASSEN: I just wanted --

MR. ROSEN: This has been done.

MR. KLASSEN: And the second question. It was on page 8, and it wasn't quite clear, whether the Attorney General has actually collected penalty fines from a municipality or an industry.

MR. ROSEN: At the top of page 8, in my statement, I said that we had never resorted to either criminal action or collection of a penalty. This has not been resorted to. We have not found it necessary.

MR. KLASSEN: And a third question: Are there any outstanding orders issued by the Board that have not yet been prosecuted by the Attorney General?

MR. ROSEN: There are none. There are, as I say, six pending. As a matter of fact, there is an appeals, one instance, the City of South Bend is appealing an order which had been issued after an Administrative Hearing.

MR. KLASSEN: Thank you.

CHAIRMAN STEIN: Are there any further comments or questions?

If not, thank you very much, Mr. Rosen.

MR. POOLE: Just one addition to make to Mr. Klassen's last question. There are a few outstanding orders that have not been referred to the Attorney General.

Next on our list is Mr. Perry Miller, who is the Assistant Director of the Division of Sanitary Engineering of the State Board of Health and is more intimately acquainted with the problems and programs in Lake and Porter Counties, Indiana, than any other one in our organization.

He is going to make the technical presentation. Mr. Miller.

MR. MILLER: Mr. Chairman, conferees, ladies and gentlemen, my name is Perry Miller. I am Assistant Director of the Division of Sanitary Engineering, Indiana State Board of Health.

Mr. Chairman, I would request that the entire report be included in the record and I will only summarize it here for you.

CHAIRMAN STEIN: This will be done without objection, and I suggest, Mr. Poole, that we do the same with Mr. Rosen's report because he obviously didn't read all the citations.

Thank you.

PREPARED STATEMENT
of
Samuel R. Rosen
Deputy Attorney General, State of Indiana, on behalf of Indiana.

THE LEGAL BACKGROUND OF STREAM POLLUTION CONTROL IN THE STATE OF INDIANA

The problem to a lawyer in presenting a legal background on any subject is the problem of avoiding the pitfalls of over-emphasis on legalistic phraseology, and in turning out a legal brief rather than an understandable presentation for the nonlegally trained.

There was a recent cartoon in the New Yorker Magazine, depicting two well-dressed gentlemen along side a stream, both observing the debris of bottles of Napoleon Brandy, but butts of Havana Corona cigars and empty cans of Caviar and Foie Gras floating by. One of the gentlemen observing this remarked, "The stream may be polluted, but at least it is only polluted with the best."

The observation of pollution started as early as 1856 in the State of Indiana, in the leading case of Sloan against the State, cited in 8 Ind. 312. One, Sloan, was convicted of causing a nuisance by pouring the slops of the Bates House, the leading Hotel in Indianapolis, into the street where it made offensive pools along the west side of Illinois Street. Thereafter, an early statute defined a nuisance as, "Whatever is injurious to health, or indecent, or offensive to the senses, or an obstruction to the free use of property, so as essentially to interfere with the comfortable enjoyment of life or property." (G & H 628)

In 1868 in the State against Taylor, cited in 29 Ind. 517, one, Taylor, was indicted for depositing domestic waste in the spring near a highway from which travelers were accustomed to drink. The indictment was upheld as a public offense under the nuisance statute, which I have already outlined.

This is probably the first case in the State involving stream pollution. Thereafter, various statutes and amendments were made by the Acts of 1881; Acts of 1901, p. 96; Acts of 1909, c. 24; Acts of 1913, c. 35; Acts of 1913, c. 147; Acts of 1927, c. 45; Acts of 1935, c. 152; Acts of 1943, c. 214.

The present law remains essentially the same as written by Chapter 214 of the Acts of 1943, although there have been important amendments thereafter. In 1945, c. 132 and 1957, c. 64.

In essence, the present law creates a Stream Pollution Control Board of 7 members who are comprised of the Secretary of the Indiana State Board of Health, the Director of the Department of Conservation and the Lieutenant-Governor of the State of Indiana, all serving as ex-officio members of said Board. The remaining 4 members are appointed by theGovernor for terms of 4 years, no more than 2 of which shall be of the same political party.

The Governor fills vacancies for unexpired terms and may remove any member for cause. Ex-officio members serve without pay, the other members of the Board shall be paid mileage and a per diem fee. The Act provides for 6 regular meetings per annum and the Secretary of the State Board of Health shall designate a qualified sanitary engineer as technical secretary of the Stream Pollution Control Board, who is Blucher A. Poole, the Representative of the Stream Pollution Control Board present at this Conference.

The jurisdiction of the Board is to control and prevent pollution in the waters of the State of Indiana with any substance which is deleterious to the public health or to the prosecution of any industry or lawful occuption, or whereby any fish life or any beneficial animal or vegetable life may be destroyed, or the growth or propagation thereof prevented or injuriously affected.

The powers of the Board are widespread in that it may bring any appropriate action in law or inequity in the name of the State of Indiana. It may hold Administrative Hearings, issue orders to any person, corporation, municipal corporation, partnership or legal entity to acquire, construct, repair, alter or extend such plants as may be necessary for the disposal or treatment of organic and/or inorganic matter which is causing, or contributing to, or about to cause or contribute to a polluted condition of the waters of the State.

It has the power of sealing mines, oil and gas wells, brine wells or any other subterranean strata causing, contributing to or about to cause or contribute to a polluted condition of the waters of the State.

It has the right of reasonable inspection upon private or public property and may call upon any State officer, board, department, school, university or other state institution and the officers thereof for assistance.

It may determine what qualities and properties of water shall indicate a polluted condition.

Whenever the Board shall determine that any corporation, municipal corporation, association, partnership, person, or any other legal entity, is violating the various provisions as outlined in the Act, there shall be an Administrative Hearing. Methods of serving notice and holding hearings and thereafter issuing orders and enforcing the same with rights of appeal to the parties against whom said Administrative Hearings are held, are all outlined in the Act. (Administrative Adjudication and Court Review, Burns 63-3001 to 63-3030)

All plans and specifications for abatement or correction of any polluted condition must be approved by the Stream Pollution Control Board.

If the offenders be a municipal corporation, the Act provides the steps necessary for the payment of funds available for such purposes in construction, acquisition, improvement, equipment, custody, operation, repair and maintenance of any plant, machinery or works, or if there is insufficient funds, it provides the necessary funds shall be raised by the issuance of bonds, subject to the approval of the Indiana Tax Board. (Burns 68-528 It limits the use of these funds for specific purposes and provides for a penalty for any individual offender, or any members of a partnership or any officer or private corporation, association or other legal entity, or any mayor, councilman, or member of a board of public works and safety, or any municipal corporation, who fails or refuses to discharge any duty imposed upon him by this Act or by final order of the Stream Pollution Control Board, may be deemed guilty of a misdemeanor and upon conviction thereof, shall be fined not less than $25.00 and not more than $100.00, to which may be added imprisonment in the county jail for any period not to exceed 90 days.

It gives the Stream Pollution Control Board discretion to extend the time fixed in any final order and provides that any of the above persons or corporations as described in the above paragraphs, who do not comply with the order within the fixed time or within the time additionally granted, shall be subject to a penalty of $100.00 for each day that such polluted condition continues to exist after the time so fixed, or as additionally granted, which may be recovered in a civil suit brought in the name of the State of Indiana, which is in addition to the penalties outlined under misdemeanor.

It shall be the duty of the Attorney General to prosecute all actions for penalties under this Section, and all penalties so recovered shall be paid into the common school fund of the State.

In practice this Act has worked effectively. There are various suits pending against corporations and individuals, and outlined as follows:

Since the inception of the laws of 1943, there have been some 232 separate matters involving municipalities or industries. The greatest majority have been concluded successfully without the necessity of resorting to court action, by ruling of the Board after an Administrative Hearing.

With the passage of years since 1943, the various matters have increased in number as have the problems of pollution.

For example, in 1964 there were 25 Hearings scheduled with municipalities or corporations; 20 separate conferences held; 15 Orders issued by the Board and 3 facilities were constructed in lieu of Hearings.

In projecting the probable Hearings and Conferences which will be held in the year of 1965, it appears certain that both the number of Hearings to be scheduled will be increased, as will the number of Conferences.

There are at least 6 separate matters pending in the courts of the State which involve either appeals from rulings of the Administrative Hearing by the Stream Pollution Control Board, or application by the State for enforcement of cease and desist orders.

We have yet to resort to the penalty provisions provided by the Act, asking for a conviction as misdemeanor offenders, or asking for financial penalties.

There is a close cooperation between the office of the Attorney General and the Stream Pollution Control Board in passing on correspondence and attending Conferences, and in preparation of all notices, as well as the conduct of Administrative Hearings. This includes the review of testimony and transcripts taken at the Hearings and, of course, all court actions are exclusively handled by the Attorney General's office.

In conclusion, it is significant to note that the highest court of our State has upheld the Stream Pollution Control Act in the following cases: Manner vs. Terre Haute, 163 N. E. (2nd) 577 and Plymouth vs Stream Pollution Control Board, 238 Ind. 439, 151 N. E. (2nd) 626. Thus, we have an effective law which is being administered in an effective manner! The Stream Pollution Control Board is affirmatively and agressively functioning. It is successfully waging the continuous war against water pollution.

FOR CONFERENCE
ON
GRAND CALUMET RIVER, LITTLE CALUMET RIVER, CALUMET RIVER, LAKE MICHIGAN, WOLF LAKE AND TRIBUTARIES
(INDIANA-ILLINOIS)

CALLED BY

SECRETARY ANTHONY J. CELEBREZZE
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

STARTING MARCH 2, 1965
CHICAGO, ILLINOIS

ON BEHALF OF
THE

INDIANA STREAM POLLUTION CONTROL BOARD

FEBRUARY, 1965

TABLE OF CONTENTS

Page

INTRODUCTION 626

BASIN REPORTS

- Grand Calumet-Indiana Harbor Canal-Lake Michigan 636
- Little Calumet-Burns Ditch 649
- Little Calumet (West) 655
- Grand Calumet (West) 659
- Wolf Lake 662

CONCLUSIONS 663

APPENDICES

INTRODUCTION

The conference was called by the Secretary of Health, Education, and Welfare (HEW), under the provisions of Section 8, of the Federal Water Pollution Control Act (Public Law 660) of 1956, as amended in 1961, based upon reports, surveys, and studies conducted by the Department in conjunction with the Great Lakes-Illinois River Basin project.

The chronology of events concerning this conference begins with a letter dated December 15, 1964, (Appendix 1) from the Secretary of HEW. This letter was Indiana's first official notice. The matter was referred to the Stream Pollution Control Board members on December 22, 1964, (Appendix 2). The Board members directed the Technical Secretary to designate 17 cities and towns (Appendix 3) and 33 industries (Appendix 4) to participate in this conference. The Board notified the Secretary of HEW on December 29, 1964, (Appendix 5) of its intentions regarding this conference.

The State of Indiana has been working for many years to improve and maintain the water quality in this area in such condition that all users, present and future, have acceptable water. In an effort to overcome pollutional problems in the south end of Lake Michigan and to collect data on which to base water quality criteria, the State of Indiana prepared, in 1953, an outline (Appendix 6) of a proposed survey for the south end of Lake Michigan. The survey was to be undertaken and financed by Indiana, Illinois, Department of Water and Sewers of the City of Chicago, the Metropolitan Sanitary District of Chicago, Public Health Service, and municipal and industrial interests. This survey was to be conducted over a two-year period at a cost of about $250,000. The survey was not undertaken because of failure to reach an agreement with all parties concerned.

In 1935, the first comprehensive stream pollution abatement law was passed, and under provisions of the law the cities of East Chicago, Gary, Hammond, and Whiting were ordered, in 1937, to abate pollution of the Grand Calumet River, the Indiana Harbor Canal, and Lake Michigan. East Chicago, Gary and Hammond complied by formation of sanitary districts and the construction of sewage treatment works.

The Stream Pollution Control Board (hereinafter referred to as the Board) was created by Chapter 214, Acts of 1943, (Appendix 7). This statute as amended provides for the Board members, grants the Board control over the pollution of any waters of this State with the powers to make determinations, orders, and regulations. It further prescribes the powers and duties of the Board to prohibit the pollution of any waters of this State and provides for the raising of funds by municipal corporations to comply with the orders of the Board. It provides penalties for the violation thereof; and repealed the 1935 statute referred to above.

The State of Indiana has made real progress in its pollution abatement program under the 1943 law. The number of municipalities served by sewage treatment works has more than doubled during the past 17 years. The investment in sewage works increased from $38.2 million to over $361.6 million.

Indiana recognizes its obligation to provide improved water to the neighboring State of Illinois. Water quality monitoring data from Indiana Harbor Canal and Burns Ditch show water quality has not deteriorated. The water of Lake Michigan is usable for public water supplies and there is no threat to the health of the people by this use. The Board, even with increased industrial activity and population growth, has not lost ground in maintaining water quality in Lake Michigan.

The Indiana portion of this area is included in two counties, Lake County and Porter County. Since the turn of the century, Lake County, Indiana, has experienced a tremendous rate of growth. In 1900 the County had 37,892 inhabitants, while the 1960 census showed a population of 513,269 persons, an increase of 1,250 per cent. The plentiful supply of water available from Lake Michigan; industrial development; excellent highway, railroad and waterway transportation arteries; and the Chicago urban area are a few factors stimulating this phenomenal growth. It should be noted that 84 per cent of the Lake County population is located in the upper third of the County along the shores of Lake Michigan and the major watercourses of the Calumet Basin.

Porter County has also experienced accelerated growth since 1940. The increase between 1940 (27,836) and 1960 (60,279) was 117 per cent as compared to an increase of only 45 per cent between 1900 (19,175) and 1940. The growth of Porter County is expected to increase at even a greater rate due to: (1) The recently completed Midwest Steel Division, National Steel Corporation plant located at Burns Ditch and Lake Michigan; (2) The Bethlehem Steel Corporation plant now under construction just east of the Midwest plant, and (3) The proposed Burns Ditch Port and Harbor development.

There are 33 industries with separate outfalls to Calumet-Lake Michigan Basin. The attached map (Figure 1) shows the location of these industries, the cities and towns and the major watercourses of the Indiana Calumet Region.

More than 83 per cent (476,175) of the Lake and Porter County population (573,546) is located in 20 incorporated municipalities within the Calumet River Basin. Five of these with a 1960 population of 18,398 have no sewer systems. Twelve, representing 98 per cent of the sewered urban population, provide sewage treatment. The remaining three are under Board order to abate pollution of receiving waters and two now have projects under construction. The last municipality has engaged an engineer to study its sewage works needs.

Fifteen municipalities in the Calumet River Basin have invested approximately $72,400,000 in sewerage and sewage treatment facilities during the past 30 years. Approximately $61,000,000 of this has been spent since 1950. Eight sewage treatment plants serve 12 municipalities. Two plants are under construction. The remaining one with sewers has a project under construction to connect to an existing plant. These plants provide secondary treatment and five have chlorination facilities. Of the five towns without a sewer system, Portage submitted a preliminary engineering report on sewers and sewage treatment to the Board in 1962.

The East Chicago, Gary, and Hammond Sanitary Districts account for more than 82 per cent ($59.4 million) of the $72.4 million invested cost noted above. East Chicago completed major sewage treatment plant improvements in 1960, the Hammond plant improvements were completed in 1964, and the Gary improvements were placed under construction late in 1962. Hammond has completed storm sewer separation projects with discharge of storm water to Wolf Lake and Gary has completed separation in one area and has one project under construction. Both cities are planning additional storm sewer separation. In addition, Highland, Hobart, Munster, and Schererville are providing separate sewers in new development areas and other communities have been advised of the necessity of planning for separate storm and sanitary sewers.

There are 37 semi-public installations in the Calumet River Basin with sewage treatment facilities discharging to receiving waters. As municipal sewers become available, many of these plants will be abandoned.

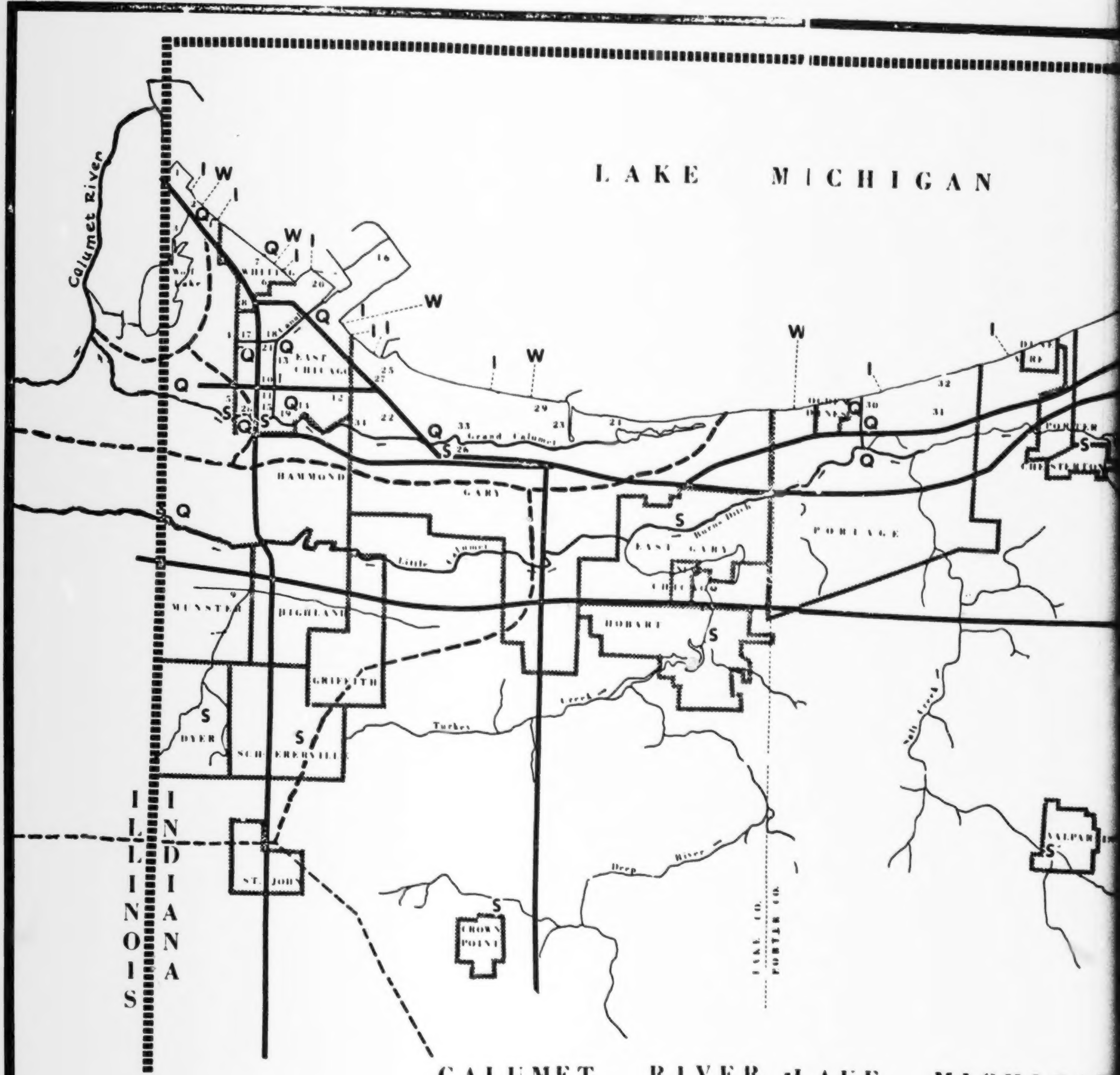
Industry has expended or committed approximately $73,200,000 for treatment facilities in the Basin. Approximately $50,000,000 has been spent or committed since 1950.

The Calumet area is one of the most highly industrialized areas in the country and primarily basic in steel production and oil refining. Also, food and chemical processing and metal fabrication plants are located in the area. The steel mills and oil refineries account for about 94 per cent of the industrial waste treatment dollars in the Basin.

Approximately $53,500,000 have been expended or committed by eight major steel plants. Currently, the steel industry is experiencing a period of major plant renovations and considerable sums are being spent and will be spent for adequate industrial waste treatment facilities. One of the outstanding industrial waste treatment facilities of the country is at the new plant of the Midwest Steel Division, National Steel Corporation, Portage. The facilities include an activated sludge plant with chlorination of the effluent. Industrial waste treatment consists of acid-alkali neutralization, oil emulsion breaking with terminal coagulation and settling, and deep well injection of waste pickle liquor. The approved sewage and industrial waste facilities which are under construction at the Burns Harbor Plant, Bethlehem Steel Company, Chesterton, will be equally extensive and, further, a terminal lagoon will be included.

All oil refineries in the Basin provide A.P.I. oil separators. Approximately $15,000,000 of the $73,200,000 total has been expended by four major oil companies. Sinclair Refining Company, East Chicago, is an excellent example of water re-use. The Company utilizes cooling towers with a total in-plant water recirculation of 168,000 gpm and a waste discharge of 3,500 gpm. American Oil Company, Whiting, provides biological treatment for oxidation of dissolved organics and removal of oils.

A


LAKE MICHIGAN
Calumet River
ILLINOIS
INDIANA
Wolf Lake
WHITING
EAST CHICAGO
HAMMOND
GARY
Grand Calumet
Little Calumet
Burns Ditch
EAST GARY
NEW CHICAGO
PORTAGE
OGDEN DUNES
DUNE ACRES
PORTER
CHESTERTON
MUNSTER
HIGHLAND
HOBART
GRIFFITH
DYER
SCHERERVILLE
ST. JOHN
CROWN POINT
VALPARAISO
Turkey Creek
Deep River
Salt Creek
LAKE CO.
PORTER CO.
I
W
Q
S

CALUMET RIVER-LAKE MICHIGAN DRAINAGE BASIN

B

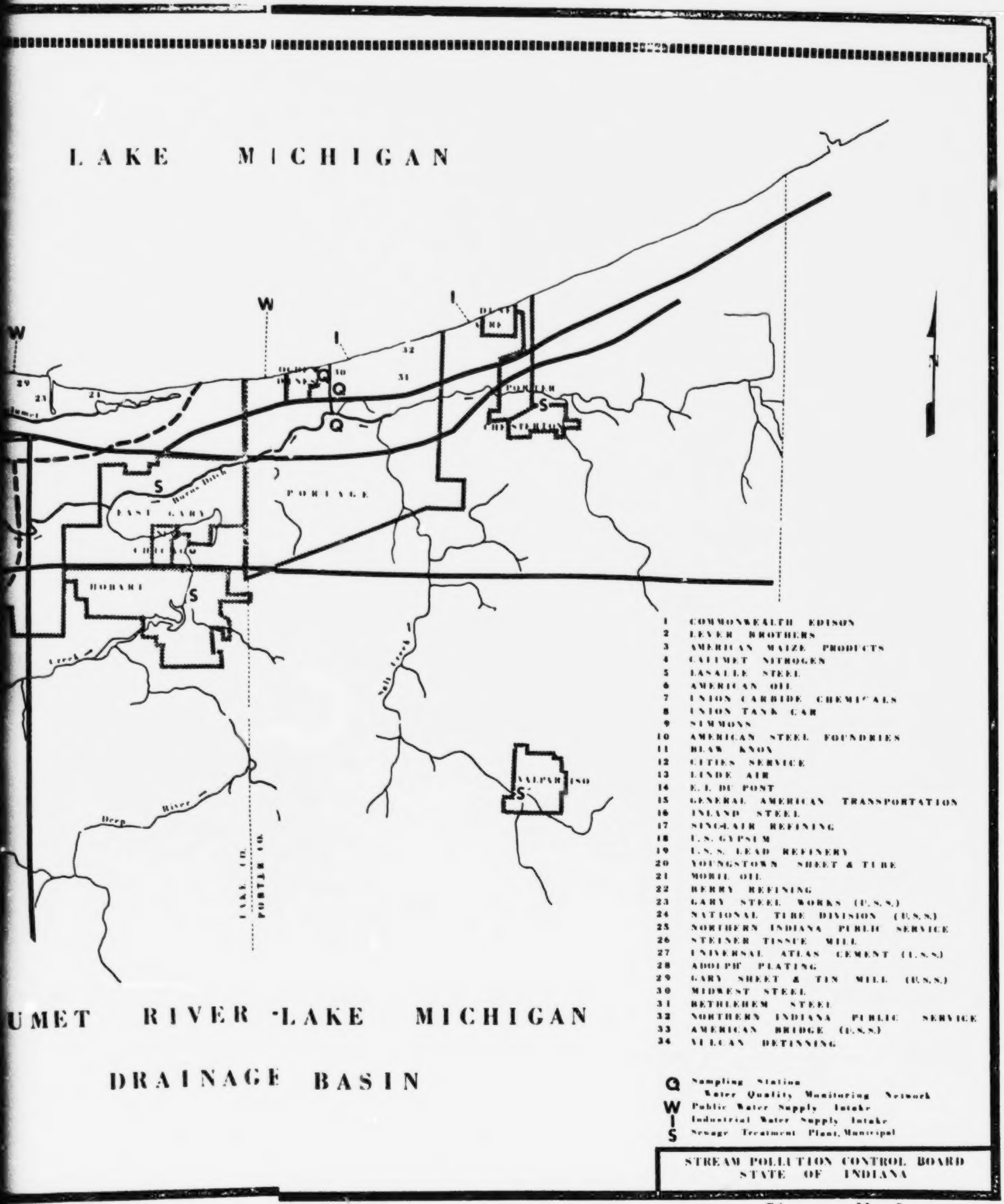

LAKE MICHIGAN
W
W
I
I
32
31
30
29
23
24
Q
Q
Q
S
S
S
S
PORTER
CHESTERTON
PORTAGE
Burns Ditch
EAST GARY
NEW CHICAGO
HOBART
Creek
Salt Creek
VALPARAISO
Deep River
LAKE CO.
PORTER CO.
N
UMET RIVER -LAKE MICHIGAN
DRAINAGE BASIN
1 COMMONWEALTH EDISON
2 LEVER BROTHERS
3 AMERICAN MAIZE PRODUCTS
4 CALUMET NITROGEN
5 LASALLE STEEL
6 AMERICAN OIL
7 UNION CARBIDE CHEMICALS
8 UNION TANK CAR
9 SIMMONS
10 AMERICAN STEEL FOUNDRIES
11 BLAW KNOX
12 CITIES SERVICE
13 LINDE AIR
14 E. I. DU PONT
15 GENERAL AMERICAN TRANSPORTATION
16 INLAND STEEL
17 SINCLAIR REFINING
18 U. S. GYPSUM
19 U.S.S. LEAD REFINERY
20 YOUNGSTOWN SHEET & TUBE
21 MOBIL OIL
22 BERRY REFINING
23 GARY STEEL WORKS (U.S.S.)
24 NATIONAL TUBE DIVISION (U.S.S.)
25 NORTHERN INDIANA PUBLIC SERVICE
26 STEINER TISSUE MILL
27 UNIVERSAL ATLAS CEMENT (U.S.S.)
28 ADOLPH PLATING
29 GARY SHEET & TIN MILL (U.S.S.)
30 MIDWEST STEEL
31 BETHLEHEM STEEL
32 NORTHERN INDIANA PUBLIC SERVICE
33 AMERICAN BRIDGE (U.S.S.)
34 VULCAN DETINNING
Q Sampling Station Water Quality Monitoring Network
W Public Water Supply Intake
I Industrial Water Supply Intake
S Sewage Treatment Plant, Municipal
STREAM POLLUTION CONTROL BOARD
STATE OF INDIANA

Figure No. 1

These accomplishments by municipalities and industries have been possible in many cases with no legal action necessary. The Board operates on a basic policy of education and persuasion rather than compulsion. However, legal action is undertaken, if necessary, in cases where improvements are not made within a reasonable time. This policy has been successful. Since 1943, it has been necessary to take 13 enforcement actions in the Basin. The following list shows the municipalities or industries for which it was necessary to undertake enforcement actions:

Municipality or Industry		Date Order Issued
Highland		December 14, 1945
Munster		December 14, 1945
Valparaiso		July 29, 1949
Crown Point		November 19, 1948
Hobart		September 28, 1948
Whiting	Stipulation accepted	February 9, 1954
Lever Brothers	Stipulation accepted	June 25, 1957
Griffith		July 30, 1959
Dyer		June 22, 1960
Hammond Sanitary District		September 21, 1960
Lever Brothers		Pending
Schererville		August 22, 1962
Porter		October 8, 1964

In April, 1964, the Technical Secretary of the Board requested those public and semi-public sewage treatment plants needing effluent chlorination facilities to submit a timetable for provision of the necessary facilities. The following list shows the status of municipal chlorination facilities:

Municipalities	Chlorination Facilities
Chesterton	Facilities in operation.
Crown Point	Facilities in operation.
East Chicago	Chlorinating in effluent channel.
East Gary (Miller District)	No facilities, considering connection to Gary's main sewage treatment plant.
Gary	Under construction.
Hammond	Submitted preliminary report for chlorination facilities.
Hobart	Facilities in operation.
Valparaiso	Facilities in operation.
Dyer	Under construction.
Schererville	Under construction.

Of the 37 semi-public sewage works installations in the Basin, at least eight plan to connect to municipal sewers in the near future. Twelve of the remaining 29 provide effluent chlorination facilities, one provides a terminal lagoon, five have sand filters, and four have plans for chlorination facilities approved and/or are planning construction of facilities in 1965. Efforts will be continued to obtain effluent chlorination facilities at the seven other installations.

Nineteen of the 20 communities in the Calumet-Lake Michigan Basin are served with public water supplies. Surface water is used by 13 communities and six use ground water.

The following list summarizes the public water supply information:

City	Source	Remarks
Whiting	Lake Michigan	Uses American Oil Co., intake.
Hammond	Lake Michigan	
Munster		Served by Hammond.
Highland		Served by Hammond.
Gary	Lake Michigan	Gary-Hobart Water Corp.
Hobart		Served by Gary-Hobart Water Corp.
Griffith		Served by Gary-Hobart Water Corp.
New Chicago		Served by Gary-Hobart Water Corp.
East Gary		Served by Gary-Hobart Water Corp., and retained wells as standby.
Portage		Served by Gary-Hobart Water Corp.
Ogden Dunes	Lake Michigan	Infiltration gallery.
East Chicago	Lake Michigan	
Valparaiso	Flint Lake	
Dyer	Wells	
Schererville	Wells	
St. John	Wells	
Crown Point	Wells	
Chesterton	Wells	
Porter		Served by Chesterton.

Lake Michigan water in the area under consideration, even with the existing local pollution, is, in general, of good quality. The water purification plants, with a minimum of treatment, produce a safe and excellent quality of water at all times.

The water east of the Indiana Harbor breakwater is generally very good. This is borne out by the remarks of Mr. Leo Louis, President of the Gary-Hobart Water Corporation, to Senator Birch Bayh in a letter dated February 10, 1965.

> "The second filtration plant, now under construction, is being built in the southwest corner of the Town of Ogden Dunes adjacent to the Inland Steel Company property. The primary reason we moved that far east was because we were unable to obtain other property and access to the lake closer to Gary ... water quality had nothing to do with our decision to move to the Porter County site ... In general, our raw water supply is very good, and, while we do have some periods of unsatisfactory water which result in some increased chemical costs and increased technical supervision techniques, we have never complained too much about

> these problems. We are anxious, of course, to keep pollution in the lake to a minimum, but we have been willing to undertake some increased treatment costs realizing that Lake Michigan water is so very much better than many other utilities in other parts of the country have to deal with. We are also cognizant of the fact that we are located in an industrial area, we serve large industries with at least part of their water supply, and we are anxious to have other industries locate in our area to promote the growth of the area and our water system."

The water north of the Calumet Harbor breakwater is generally very good. The Department of Health, Education, and Welfare report for this conference shows a "Summary of Raw Water Problems," Table VIII-1 for the Chicago South District Filtration Plant, 1963-4. Included in this table are 23 days in 1963 and 12 days in 1964 of hydrocarbon odors, indicating a relatively few days of problems of this type. It is believed the water supplied Chicago citizens on these days was safe and of excellent quality.

The water quality between Calumet Harbor and Indiana Harbor breakwaters is poor. The report of Health, Education, and Welfare indicates there are flow reversals in the Calumet River resulting in pollution of Lake Michigan in Indiana. Officials of the Hammond water purification plant have reported high threshold odors with accompanying high carbon dosage to remove the odor when winds are from the north and northwest indicating water movement from Calumet Harbor to the Hammond intake. Popcorn slag has been found on all beaches between the two breakwaters and the sources of this slag are U. S. Steel, South Works, and Wisconsin Steel Works in Chicago, indicating water movement from Calumet Harbor to Indiana. Water movement is also from Indiana north when winds are from the south. Hammond and Whiting water purification plants report more days of high threshold odor than the other water plants in the south end of Lake Michigan. However, water supplied by Hammond and Whiting is safe and does not jeopardize the health of the consumers.

On June 12, 1964, HEW submitted a report entitled, Preliminary Draft, Report on Sampling of Industrial Wastes, Indiana Portion-Calumet Area,"to the Board. The report listed analyses of samples collected by Great Lakes-Illinois River Basin personnel from industrial waste sources in Indiana. Based upon information contained in the report, the Board in June and September, 1964, requested the following companies to develop comprehensive industrial waste programs with timetables (Appendix 11):

U. S. Steel Corporation, Gary Steel Works, Gary
U. S. Steel Corporation, Gary Sheet and Tin Mill, Gary
Youngstown Sheet and Tube Co., East Chicago
Inland Steel Co., East Chicago
Mobil Oil Co., East Chicago

All responded and submitted information on what was being done and planned for the future to reduce pollution.

Water quality in the southern end of Lake Michigan is of utmost concern to the Board. On December 14 and 15, 1964, after studying the operating records of the Hammond, Whiting, East Chicago and the Gary-Hobart water treatment plants and noting the amount of activated carbon which was used to remove tastes and odors, the Board requested 10 industries (Appendix 12)

(1) to redouble efforts to improve housekeeping by eliminating or holding to an absolute minimum the wastes discharged to plant sewers; (2) to eliminate the dumping of wastes of non-saleable compounds to the sewers and watercourses, and (3) to improve where possible the operation of existing treatment works.

The waters of Lake Michigan are used for recreational activities. There is fishing and boating in the upper portions of the Little Calumet-Burns Ditch and Grand Calumet River. Lake Michigan and Wolf Lake as well as a few small inland lakes furnish the major swimming and fishing areas.

In April of 1957, a State-wide water quality monitoring program was established. Samples are collected by State Board of Health personnel and co-operating agencies at each station on a bi-weekly schedule. The results of analyses at these stations are published each year on a calendar-year basis.

The initial program included 49 sites, three sites were located in the Calumet Area. These sites are:

1. Grand Calumet River at Hohman Avenue bridge in Hammond (Appendix 13).
2. Little Calumet River at Hohman Avenue bridge in Hammond (Appendix 14).
3. Lake Michigan at the raw water intake of the Whiting water works (Appendix 15).

During the summer of 1960, it became apparent that additional monitoring stations were necessary in the Calumet Area. In August, 1960, the following stations were established:

1. Grand Calumet River at the bridge on U.S. 12 (Appendix 16).
2. Grand Calumet River at the bridge on Kennedy Avenue (Appendix 17).
3. Grand Calumet River at the bridge on Indianapolis Boulevard (Appendix 18).
4. Indiana Harbor Canal at the bridge on Columbus Drive (Appendix 19).
5. Indiana Harbor Canal at the bridge on Indianapolis Boulevard (Appendix 20).
6. Indiana Harbor Canal at the bridge on Dickey Road (Appendix 21).
7. Burns Ditch at the catwalk near mouth of Burns Ditch (Appendix 22).

In February of 1963, a station downstream from Lever Brothers, (Appendix 23) was established in the Wolf Lake Channel.

With the increased development in the Burns Ditch area, it was decided that even more sampling stations were required. In February, 1964, the following two stations were established:

1. Burns Ditch at the bridge on Chrisman Road (Appendix 24).
2. Burns Ditch at the railroad bridge on the Mid-West Steel property, just north of U. S. 12 (Appendix 25).

In order to make a final determination of the treatment requirements for some of the industries in the Indiana Calumet region, water quality criteria must be established. Without the necessary data or water quality in the area and on the sources of waste discharges, criteria cannot be easily determined. It is understood that the Great Lakes-Illinois River Basin project now in the final phases of its Lake Michigan activities, will provide these data. Therefore, establishment of water quality criteria should be one of the objectives of this conference.

The present problems of water quality in the Calumet-Lake Michigan area can be summed in the following paragraphs which were a part of the State of Indiana's testimony at a Public Hearing Concerning the Nation's Water Pollution Problems for the House Natural Resources and Power Subcommittee of the Committee on Government Operations, held in Chicago September 6, 1963.

"While much has been accomplished by the treatment of sewage and industrial wastes in the Indiana Calumet region there are still problems. Some of these are extremely complex and there are always dangers of oversimplification. Notwithstanding this and the lack of the Great Lakes-Illinois River Drainage Basin Report of the Public Health Service, the following general statements can be made as to the water quality needs of this Area:

"1. Tastes and Odors - Organics in the waters of the Indiana Harbor Canal and in effluents going directly to the Lake contribute to the taste and odor problems of some of the cities that use water from the south end of Lake Michigan. Better housekeeping and more careful operation of existing treatment works will resolve some of these problems. However, removal of a higher percentage of these organics at their source is essential if the water supplies are to have a continuously satisfactory raw water.

"2. Coliforms - Coliform bacteria counts are too high in all streams. These, unlike tastes and odors which are due almost entirely to industrial wastes, have their origin in city sewage. They are of particular significance in the Indiana Harbor Canal and in Burns Ditch since these waters outlet into Lake Michigan. Significant reduction will take place in the Little Calumet and Grand Calumet Rivers on completion of the construction work at Hammond, Griffith, Munster, Highland, Dyer and Schererville. The work under way at Gary will reduce counts in the Indiana Harbor Canal. Full control of the high coliform counts cannot be expected until combined sewers are eliminated. Sewer separation is costly and time consuming. Work has been started in Gary, Hammond and some of the smaller cities, but this involves only a small percentage of the total problem.

"3. Solids - Upon completion of the municipal treatment works now under construction the solids getting to the waterways will be largely of an inert nature. While they have little bearing on the quality of Lake Michigan, additional solids removal in the Grand Calumet-Indiana Harbor Canal drainage area is indicated.

"4. Aesthetic Considerations - It is not reasonable to expect waters draining highly industrialized areas to have the same appearance as waters draining undeveloped areas. But one can expect them to be reasonably free of floating material, sludge banks and color. Accomplishment of the objectives outlined above will do much to improve the appearance of the waters of the region.

The physiography of the entire Calumet Basin is such that gradients of most streams in the area are flat (providing sluggish conditions and poor natural purification capacity), and many low, swampy areas are located in the Basin. Because of these conditions, the Grand Calumet and Little Calumet Rivers normally flow in two directions. Both flow west into Illinois and east into Lake Michigan via the Indiana Harbor Canal and Burns Ditch, respectively (Figure 1). However, during periods of heavy storm runoff, these two rivers reverse flow and water from Illinois enters Indiana and thence to Lake Michigan. This condition also exists in the Calumet River of Illinois and its waters carrying industrial wastes and storm water overflow from the Metropolitan Sanitary District enters Lake Michigan, including the Indiana portion of Lake Michigan.

In order that the new O'Brien Lock may operate without the diversion of Lake Michigan through the Grand Calumet River a temporary barrier dam must be constructed. Sites under consideration are in the vicinity of Hammond and East Chicago. The Public Health Service wants the dam so located that the effluents from the Hammond and East Chicago sewage treatment plants are diverted into the Illinois River Basin. It is believed that the same degree of treatment may be necessary whether the wastewater effluents flow to the Illinois River Basin or to Lake Michigan.

For the remainder of this report, information, data, discussions, summaries and conclusions will be presented by drainage basins as follows:

1. Grand Calumet River-Indiana Harbor Canal-Lake Michigan
2. Little Calumet River-Burns Ditch
3. Little Calumet River (West)
4. Grand Calumet River (West)
5. Wolf Lake

Appendices 26 through 29 provide summaries of information on industries, municipalities, semi-public installations and selected copies of pollution abatement orders.

GRAND CALUMET - INDIANA HARBOR CANAL - LAKE MICHIGAN

The Grand Calumet River originates near the eastern border of Lake County. Practically all of the dry-weather flow in the river is industrial cooling and process water, and waste treatment plant effluents. Thus, the flow varies depending on the amount of water used by industry and municipalities. Generally, the flow returns to the lake via the Indiana Harbor Canal; however, the direction of flow in the canal can be in either direction depending on the lake level. The river and canal receive the treated waste effluents from the East Chicago and Gary Sanitary Districts, numerous industries and some untreated industrial wastes. Samples collected from the canal at the Dickey Road water quality monitoring station revealed high coliform counts. It is discolored and contains oil and other floatable material. In addition to the wastes introduced to Lake Michigan through the canal, the lake receives effluents from seven industries and three power plants.

The Sanitary Districts of East Chicago and Gary provide adequate sewage treatment facilities. East Chicago provides effective chlorination in the effluent channel and effluent chlorination facilities are now under construction at Gary. The facilities are well operated and maintained and produce a good quality effluent. Construction of plant additions at Gary necessitated some bypassing of raw and inadequately treated sewage; however, primary and secondary treatment are now provided.

Storm water pumping stations and storm water overflow from combined sewers discharge storm water to the Grand Calumet River and Indiana Harbor Canal. Hammond and Whiting have combined sewer overflows that discharge storm water overflows and, at times, all flow to Lake Michigan. The discharge from these installations will continue to impose a bacteria and organic load on receiving waters.

The effluents from industry comprise most of the flow in the river and canal. The Board and industry are aware that additional pollution abatement facilities may be required after water quality criteria are established. With these criteria, Indiana will require industry to reevaluate its wastewaters and install the necessary facilities.

East Chicago

The City of East Chicago is served by a combined sewer system and an activated sludge type sewage treatment plant; chlorination is provided in the effluent channel. The 1960 population was 57,669; the plant is designed for a population equivalent of 115,000 and a flow of 20.0 mgd. The City does not accept appreciable quantities of industrial waste for treatment. The plant provides approximately 95 per cent reduction in terms of 5-day B.O.D.; the facilities are well operated and maintained. The effluent is discharged to the Grand Calumet River and, under normal flow conditions, the flow is east to the Indiana Harbor Canal. Storm water overflow from combined sewers and storm water pumping stations discharge to the Grand Calumet River and Indiana Harbor Canal.

In 1928, East Chicago attempted to form a Sanitary District; however, it was not finally established until October 14, 1937. On October 14, 1937, the Indiana Department of Commerce and Industry issued a pollution abatement order to East Chicago. The Sanitary District attempted to sell a bond issue in 1938, but the bond sale was blocked. As the City was unable to go to construction, a PWA grant of $1,350,000 was lost.

In 1940, plans for sewage treatment were approved by the Indiana State Board of Health and, in 1941, a bond issue of $1,000,000 was sold. The City received approximately $950,000 in labor and materials from WPA and, in 1943, sold an additional $675,000 in bonds to complete financing of the $2,625,000 project. The sewage treatment facilities were placed in operation in June, 1945.

In 1958, plans were approved for construction of approximately 65,000 feet of sewers and sewage treatment plant improvements. A bond issue of $5,600,000 was sold to finance the construction work which was completed in 1960. With the completion of the sewer work in 1960, East Chicago had approximately 75 miles of combined sewers.

On April 22, 1964, the Board advised the District of the requirement for continuous chlorination of plant effluent. The District advised on May 25, 1964, that chlorination would be provided in the effluent channel with existing facilities. The effluent channel provides in excess of 15 minutes detention time at design flow.

Gary

The City of Gary is served by a combined sewer system and an activated sludge type sewage treatment plant. Effluent chlorination facilities are under construction. The 1960 population of Gary was 178,320. When construction of plant additions is completed, it will provide for a design flow of 80 mgd (with the exception of the aeration tank capacity which provides 6-hour detention at a flow of 60 mgd) and a population equivalent of over 500,000. The plant provides approximately 95 per cent reduction in terms of 5-day B.O.D.; the facilities are well operated and maintained. The effluent is discharged to the Grand Calumet River. Combined sewer overflows and storm water pumping stations discharge to the Grand and Little Calumet Rivers and Burns Ditch.

On October 14, 1937, the Indiana Department of Commerce and Industry issued an order to Gary for the abatement of pollution. On April 4, 1938, the Sanitary District of Gary was established and construction of sewage works was started. In 1939, the Indiana State Board of Health approved plans for an activated sludge type sewage treatment plant designed for a flow of 40 mgd. The construction was financed by a PWA grant of $2,166,133 and a bond issue of $2,652,000. In addition to the plant, approximately 16 miles of interceptor sewers were constructed. The plant started operation in August, 1940.

From 1955 through 1959, a total of $10,918,000 in Sanitary District bonds were sold to finance construction of sanitary, interceptor and relief sewers. Some of the work undertaken during this period and projects now under construction provide separate storm water sewers.

Plans for sewage treatment plant additions, storm sewer separation in the Miller District and interceptor sewers and a lift station to provide for discharge of sanitary sewage from the Gary-Miller District area to the main plant were approved December 18, 1962. Construction was started after the sale of $9,900,000 in Sanitary District bonds on December 3, 1962. The plant provided primary treatment only during part of 1964 because of the construction program.

Chlorination facilities were not included in the plans; however, the Board approval was conditioned on provision of effluent chlorination facilities. Plans for chlorination were approved on July 19, 1963. Construction of chlorination facilities, and additional sewers, was undertaken after the sale of $4,590,000 in Sanitary District bonds on December 9, 1964.

Merrillville Conservancy District:

The Merrillville Conservancy District was established on December 28, 1962, to serve 2,647 parcels of land of which 1,277 were then undeveloped. It was estimated that 4,000 homes could ultimately be served within the original District boundaries. Since it was established, additional area has been included and a contract for sewage treatment signed with the Gary Sanitary District. The Conservancy District had planned to construct a sewage treatment plant with effluent discharge to Deep River above Lake George.

Approximately 155,000 feet of sanitary sewers, lift station and force main connection to Gary Sanitary District interceptors are now under construction. The project was financed by a $2,700,000 bond issue and a Federal grant of $181,740.

Completion of these facilities will provide for abandonment of semi-public sewage treatment facilities now serving the Merrillville Bowling Alley, Merrillville primary, grade and high schools and Chapel Manor Subdivision.

Vulcan Materials Company, Gary

Mr. E. W. Young, President, Vulcan, notified the Board on January 11, 1965, (Appendix 30) that on or before March 1, 1965, all wastewaters would be eliminated from the Grand Calumet River. The plant located in Gary in 1955 for the purpose of recovering tin from scrap tin plate. Approximately 2,800 gpd of wastewater is discharged to the river. Mr. Young indicated that as of March 1, 1965, this wastewater will be sold. All sewage is treated in a septic tank-absorption field system. Estimated expenditure for water pollution control facilities is $12,000.

Cities Service Petroleum Company, East Chicago

The Company pumps process water from Lake Michigan and has a pumping capacity of 115 mgd. Plant wastewaters are separated by three sewer systems: sewage, process and cooling. All plant sewage is discharged to the East Chicago Sanitary District sewerage system. Cooling water and boiler blowdown is treated in an A.P.I. oil separator which was constructed prior to 1943. In 1949, a second A.P.I. oil separator was placed in operation for treatment of process wastewaters. The cooling water flow is 77 mgd and the contaminated process wastewater flow is 4.3 mgd. These flows are combined after treatment and discharged to the Grand Calumet River.

In 1961, an ammonia and sulfide (sour water) stripper was placed in operation. Stripper bottoms are discharged to the crude oil desalter for removal of phenols. Spent caustics are sold for recovery of cresylic acid. Spent sulfuric acid is returned to the supplier for reprocessing. Hydraulic decoking waters are recirculated. An experimental column trickling filter and an experimental activated sludge plant are installed for additional treatability studies of the process wastewater.

Plans for 1965 involve the discharge of delay coking unit waters to the sour water stripper, and an automatic effluent monitoring system. About $1,745,000 has been expended by the Company for water pollution control facilities.

E. I. duPont de Nemours & Company, East Chicago

The Company purchases potable water, 2.2 mgd, from East Chicago and pumps process water, 11.5 mgd, from the Grand Calumet River. In 1947, all plant sewage was connected to the East Chicago Sanitary District sewerage system. Acid neutralization for sulfamic acid production wastes was installed in 1957. In 1962, the Company requested approval of a proposal to discharge up to 90,000 pounds per day of chlorides to the river. The chlorides are contained in by-product hydrochloric acid wastes. The proposal was submitted to HEW for comment (Appendix 31). It was requested that HEW inform the Board as to the compatibility of the proposal with the long-range planning of the GLIRB project. HEW did not express an opinion on the proposal. The Company was willing to neutralize the wastes but suggested controlled discharge for the following reasons: (1) neutralization would increase the hardness and soluble salt content of the river; (2) controlled discharge would only decrease natural river alkalinity by 25 mg/l; and (3) the chloride content of the river would be increased 18 mg/l at average flow and neutralization would not change this value. The Board approved the proposal with the understanding that the Company make an effort to sell the acid rather than discharge it to the river. The Company subsequently notified the Board that the acid would be sold and no chlorides were discharged to the river.

The Company currently discharges under controlled conditions calcium sulfate, calcium sulfamate, sodium dichromate, ammonia and herbicide production wastes to the river. About $115,000 has been expended by the Company for water pollution control facilities.

U. S. S. Lead Refinery, Inc., East Chicago

The Company uses the Grand Calumet River for cooling water. The spent cooling water is returned to the river. No process wastewaters are discharged to a surface stream. About 45,000 gallons per year of process wastewater are discharged to a ground absorption basin. In 1947, all plant sewage was connected to the East Chicago Sanitary District sewerage system. About $27,000 has been expended for water pollution control facilities.

General American Transportation Corporation, Plant 2, East Chicago

All plant sewage is discharged to the East Chicago Sanitary District sewerage system. Process wastewaters, 0.2 mgd, are treated in the following facilities: waste equalization pond, oil separator, and chemical treatment plant. The chemical treatment plant consists of coagulation, flocculation, and clarification. The treated process wastewaters are discharged to the Indiana Harbor Canal. About $200,000 has been expended for water pollution control facilities.

Blaw-Knox Company, East Chicago

Potable and process water, 1.0 mgd, is purchased from East Chicago. All sewage is discharged to the East Chicago Sanitary District sewerage system. Process wastewater is treated in settling tanks and filters prior to discharge to the Indiana Harbor Canal.

American Steel Foundries, Indiana Harbor Works, East Chicago

All sewage is discharged to the East Chicago Sanitary District sewerage system. Process waters, 0.4 mgd, are pumped from the Indiana Harbor

Canal. Process wastewaters are treated in a settling basin prior to discharge to the Indiana Harbor Canal. About $15,000 has been expended for water pollution control facilities.

Linde Air Products, East Chicago

All plant sewage and process wastewater, except cooling tower blowdown, is discharged to the East Chicago Sanitary District sewerage system. Cooling tower blowdown is discharged to the Indiana Harbor Canal.

Mobil Oil Company, East Chicago

The Company purchases potable water from East Chicago and pumps process water from the Lake George Branch, Indiana Harbor Canal. In 1947, all plant sewage was connected to the East Chicago Sanitary District sewerage system.

In 1933, and 1935, oil traps were provided for process wastewaters. In 1940, the following wastewater treatment facilities were installed: A.P.I. oil separator, raw process water treatment plant, and cooling towers for water reuse. The cooling towers reduced the process water pumpage from the canal from 26 mgd to 1.5 mgd. Spent caustics are separated for use in the wood pulping industry and for recovery of cresylic acid. All spent sulfuric acid is returned to the supplier for reprocessing. Separation tanks and an oil separator are provided for ballast water. #The Company recently installed an ammonia and sulfide stripper for sour "cat" waters. The stripper will significantly reduce ammonia, sulfide, phenol, C.O.D. and B.O.D. in the wastewaters. About $600,000 has been expended by the Company for water pollution control facilities.

Unidentified Source of Pollution-Storm Sewer Discharging to Lake George Branch, Indiana Harbor Canal, East Chicago

An unidentified source of wastewater discharged to the Lake George Branch, Indiana Harbor Canal, was investigated on February 3, 1965. The wastewaters discharge to the Lake George Branch via a storm sewer located on the northeast side of Indianapolis Boulevard. The sewer originates in the vicinity of the American Oil Company, Whiting. Two storm sewers, one on the northeast side and one on the southwest side, parallel Indianapolis Boulevard to the vicinity of Riley Avenue. At Riley Avenue, the southwest sewer crosses under Indianapolis Boulevard and is connected to the northeast sewer which drains to Lake George Branch. Estimated flow in the sewer on February 3, 1965, was 50,000 gpd. The wastewater was light in color and had a gasoline odor. The source of the wastewater has not been identified.

Calumet Nitrogen Products Company, Hammond

The Company is jointly owned by American Oil Company, Whiting, and Sinclair Refining Company, East Chicago. The plant is operated by

American Oil Company. The plant located in Hammond in 1956. Ammonium nitrate plant wastewater and all sewage is discharged to the Hammond Sanitary District sewerage system.[27] Wastewater from the ammonia plant plus cooling tower blowdown is discharged to a separation basin for removal of settleables and floatables. The basin effluent drains to the Lake George Branch, Indiana Harbor Canal. Approximately $50,000 has been expended by the Company for pollution control facilities.

Union Tank Car Company, Whiting

The Company's activities involve the construction and maintenance of railroad tank cars. Potable and process water is purchased from Whiting. Approximate water usage is 0.2 mgd. All sewage is disposed in septic tank-absorption field systems. Process wastewater is treated in skimming tanks prior to discharge to the Lake George Branch, Indiana Harbor Canal. Skimmings are chemically and thermally treated for oil recovery. Sludges from these facilities are burned. About $15,000 has been expended by the Company for wastewater treatment facilities.

Sinclair Refining Company, East Chicago

Sinclair is the second largest petroleum refinery in Indiana. The Company purchases potable water from East Chicago and pumps process water from Lake Michigan. In 1947, all plant sanitary sewers were connected to the East Chicago Sanitary District sewerage system. Treated process wastewater and recirculating process water cooling tower blowdown is discharged to the Lake George Branch, Indiana Harbor Canal.

In 1946, two A.P.I. oil separators were built to replace one of two oil separators built prior to 1933. Cooling towers are utilized on the process waters. In-plant recirculation of water is 250 mgd and treated wastewater discharge is 5 mgd. Considerable refinery equipment modification in the late 1940's and early 1950's reduced the amount of wastewater requiring treatment. An ammonia and sulfide stripper is utilized in the treatment of sour water. Stripper bottoms and cooling tower blowdown are discharged to the crude oil desalter for additional phenol extraction. Boiler blowdown and hot lime sludge is discharged to a separator for treatment. Caustics containing phenols are sold for by-product recovery. Spent caustics containing sulfides and mercapitans are oxidized. Spent sulfuric acid is returned to the supplier for reprocessing.

New ballast water A.P.I. oil separators were constructed in 1963. About $3,930,000 has been expended by the Company for water pollution control facilities.

U. S. Gypsum Company, East Chicago

The plant produces plaster, wall board and asbestos cement shingles. All sewage is discharged to the East Chicago Sanitary District sewerage system. Process wastewaters, 0.4 mgd, are discharged to the Indiana Harbor Canal.

Youngstown Sheet & Tube Company, Indiana Harbor Works, East Chicago

The Company pumps process water, 288 mgd, from Lake Michigan and discharges treated and untreated process wastewaters to the Indiana Harbor Canal and Lake Michigan. All sewage, except for isolated septic tank-absorption field systems, is discharged to the East Chicago Sanitary District sewerage system.

Dephenolizers were installed in the coke plant for wastewater treatment. Coke quenching wastes are discharged to a settling basin with partial recirculation. Tar decanter waters are discharged to the dephenolizer. Benzol condensates are double decanted prior to discharge to the canal. Scale pits are provided at all rolling mills and secondary pits are baffled to trap free oil. Wastewater discharged to Lake Michigan passes through an oil removal basin which is equipped with a continuous oil removal belt. A portion of the waste pickle liquor is trucked to the slag dump for disposal and some is discharged to the canal.

In-plant controls, in compliance with Regulation SPC-2,, to isolate concentrated cyanide solutions were installed in 1956. A gravity oil separator for a six-stand tandem mill in the No. 2 tin mill was approved by the Board and installed in 1961.

Halogen tinning line plating solution is trucked to the slag dump for disposal.

The wastewater treatment facilities for a new No. 3 cold reduced sheet mill now under construction were approved by the Board on October 23, 1964. These facilities consist of gravity oil separators and a terminal lagoon. The lagoon effluent will seep horizontally through 250 feet of slag before reaching Lake Michigan. Cooling waters containing less than 10 mg/l of oil will be discharged directly to Lake Michigan.

Flue dust thickeners and sludge dewatering equipment are installed for the blast furnace gas washer system. About $5,000,000 has been expended by the Company for water pollution control facilities.

Inland Steel Company, East Chicago

The Company pumps process water, 800 mgd, from Lake Michigan and discharges treated and untreated process wastewaters to the Indiana Harbor Canal and Lake Michigan. All plant sewage is treated in two Company owned and operated trickling filter treatment plants. A third plant is proposed. All sewage plant effluents are chlorinated prior to discharge to either the canal or lake.

In 1928, the Company installed facilities for recirculation of coke plant gas final cooling waters for phenol reduction. About 1930, a Koppers vapor recirculation phenol recovery unit was installed for ammonia still wastes. Blast furnace flue dust thickeners and vacuum dewatering facilities for thickener sludges were installed about 1931. Additional phenol recovery by light oil extraction; a settling basin for coke quenching wastes and ammonia still wastes; recirculation of coke plant tar decanter wastes; 13 scale pits; oil recovery and treatment facilities on the slab mill, 44-inch hot mill, 56-inch tandem cold mill, 40-inch tandem mill and the three-stand skinny tin line have also been provided. Fly ash and bottom ash lagoons for the new power plant have been constructed. Facilities under construction consist of: scale pits for new blooming and billet mills, scale pits, oil skimming pits, chemical flocculator-clarifiers, and a tunnel to divert wastewaters to the Indiana Harbor Canal for a new 80-inch hot strip mill. The wastewater treatment proposal for the 80-inch hot strip mill was submitted to HEW for comment.(Appendix 31). It was requested the HEW inform the Board as to the compatibility of the proposal with the long-range planning of the GLIRB project. HEW did not express an opinion on the proposal. The new oxygen steel-making facilities will have a closed stack gas washer system.

About $19,100,000 has been expended by the Company for water pollution control facilities.

National Tube Division, United States Steel Corporation, Gary

In 1949, all plant sewage was diverted to the Gary Sanitary District sewerage system. Approximately 10 mgd of process waters is obtained from the Gary Steel Works. Process wastewaters are discharged to the Grand Calumet River. About $800,000 has been expended for separation of sewers and installation of facilities to convey sewage to the Gary Sanitary District.

Gary Steel Works, United States Steel Corporation, Gary

The Company pumps process water, 577 mgd, from Lake Michigan and discharges treated and untreated wastewaters to the Grand Calumet River. Some cooling waters are discharged to Lake Michigan. All plant sewage is discharged to the Gary Sanitary District.

Ammonia still liquors are used for quenching coke. Coke quenching wastewater is recirculated. Benzol condensates are discharged to the river.

All rolling mills have primary scale pits, and a new 160 inch/210 inch plate mill has oil skimmers on the scale pits. Waste pickle liquors are discharged to seepage pits. Slag granulation wastewater is treated in settling basins prior to discharge to the river.

Flue dust thickeners are installed for partial recovery on the blast furnace gas washer system.

In 1950 and 1951, an experiment on the treatability of ammonia still liquors at the Gary Sanitary District sewage treatment plant was conducted.

The experiment was a success but the City and industry did not reach agreement to continue the project. About $11,000,000 has been expended by the Company for water pollution control facilities.

Gary Sheet & Tin Mill Division, United States Steel Corporation, Gary:

The Company pumps process water, 60 mgd, from Lake Michigan and discharges treated and untreated wastewaters to the Grand Calumet River. Some cooling water and storm water from combined process wastewater sewers is discharged to Lake Michigan. All plant sewage is discharged to the Gary Sanitary District.

Waste pickle liquors are discharged to a lagoon and seepage therefrom drains to Lake Michigan. The lagoon will be eliminated by the use of a deep well disposal system which is under construction. Waste pickle liquors and tinning line chromium solutions will be discharged to the deep well system. A lagoon for neutralized nitric and hydrofluoric acids from the stainless steel line will be constructed in 1965.

Waste treatment facilities consisting of gravity oil separators with an emergency bypass to Lake Michigan were approved by the Board in 1964 for a new 80-inch, five-stand sheet mill. These facilities have been completed and are in operation. The separator effluent is discharged to the river. About $3,600,000 has been spent by the Company for water pollution control facilities.

American Bridge Division, United States Steel Corporation, Gary

In 1945, all plant sewage was diverted to the Gary Sanitary District sewerage system. Currently, only rivet machine cooling water is discharged to the Grand Calumet River. About $1,000,000 has been expended for water pollution control facilities.

Steiner Tissue Mill, Gary

Potable water, 0.1 mgd, is purchased from the Gary-Hobart Water Company. Process waters, 1.4 mgd, are pumped from the Grand Calumet River to a clarification pond prior to use in the plant. Process wastewaters are treated in two fiber save-all units prior to discharge to the Grand Calumet River. All sewage is discharged to the Gary Sanitary District.

Berry Refining Company, Gary

All process and potable water is purchased from the Gary-Hobart Water Company. All sewage is disposed in septic tank-absorption field systems. Process wastewaters are treated in an A.P.I. oil separator and impounding basins. The effluent from the impounding basins is discharged to a swampy area on Cities Service Oil Company property. No wastewaters are dischnrged to a surface stream or lake. About $15,000 has been expended for water pollution control facilities.

Northern Indiana Public Service Company, Bailly Generating Station, Baileytown

The Bailly Generating Station started operation in 1962. Initial capacity was 175,000 kw. Maximum process water requirement is about 425 mgd and the water is pumped from Lake Michigan. Sewage is disposed in septic tank-absorption field systems. Bottom ash, fly ash and cinders are sluiced to a solids storage area. Sluicing waters and coal storage drainage are absorbed into the ground. Approximately $70,000 has been expended by the Company for pollution control facilities.

Universal Atlas Cement Company, United States Steel Corporation, Gary

Process water is pumped from Lake Michigan. Pump capacity is 72 mgd. All plant sewage is treated in a fixed-nozzle trickling filter plant. The sewage plant was built in 1926. The sewage plant effluent is discharged to Lake Michigan. During a recent inspection, fish were observed to be living in the final clarifiers. No process wastewaters other than indirect cooling waters are discharged to the lake. About $200,000 has been expended for water pollution control facilities.

Northern Indiana Public Service Company, Dean H. Mitchell Station, Gary

The plant pumps process water, 433 mgd, from Lake Michigan. Process wastewater is discharged to Lake Michigan. Sewage is treated in septic tanks. The septic tank effluent is discharged to Lake Michigan. The raw process waters are chlorinated. About $82,000 has been expended by the Company for water pollution control facilities.

Union Carbide Corporation, Chemicals Division, Whiting

Process water is pumped from Lake Michigan. Process wastewaters are discharged to Lake Michigan and the Indiana Harbor Canal. All plant sewage is discharged to the Whiting sewerage system. Cooling towers are utilized for partial reuse of product contaminated cooling waters.

In 1934, the Company initiated a program to separate sewage from other wastewaters for discharge to a municipal sewerage system. The project was completed in 1947 when all sewage was discharged to the Whiting sewerage system. During the 1935 to 1960 period, the Company installed the following facilities: wastewater clarification basin, raw water chlorination unit, closed cooling water system for direct product-contact cooling waters, and a cooling tower system, and established an effluent monitoring program. During the 1960 to 1965 period, the following facilities were added: retention basin, automatic effluent sampler, skimming pit, collection tank for land disposal of concentrated wastes, plus many other minor pollution control facilities. Approximately $950,000 was expended by the Company for pollution control facilities during the 1935 to 1965 period.

Future plans indicate that the following pollution control units will be installed in 1965 at an estimated cost of $46,100: closed water system dissolved solids removal unit, improved oil recovery facilities, screens and recovery facilities for polyethylene pellets, and wastewater laboratory equipment.

American Oil Company, Whiting

The Company is the largest petroleum refinery in Indiana. Process water is pumped from Lake Michigan and discharged to Lake Michigan after treatment. Potable waters are obtained from Whiting. All sewage, except from a few isolated buildings is discharged to the Whiting sewerage system. Isolated buildings are served by septic tank-absorption field systems. Process wastewaters are conveyed to treatment facilities via two separate sewer systems. Wastewaters containing settleables and floatables are discharged to mechanically equipped A.P.I. oil separators and thence to Lake Michigan. Wastewaters containing settleables, floatables, dissolved organics and dissolved inorganics are discharged to mechanically equipped A.P.I. oil separators and thence to "bio-flotation" facilities. The "bio-flotation" facilities consist of settling, aeration and settling units. The effluent from the "bio-flotation" facilities is discharged to Lake Michigan. Spent caustics containing sulfides and phenols are trucked to lagoons located northwest of the Lake George Branch, Indiana Harbor Canal. Cooling towers are utilized for partial reuse of cooling waters. Spent sulfuric acids are returned to the supplier for reprocessing. Separation tanks and an oil separator are utilized for ballast water at Indiana Harbor Canal docks.

Cooling towers have been installed for recirculation of 100 mgd of cooling waters. Water usage peaked in 1946 at about 200 mgd. Water usage has been gradually decreased to about 140 mdg in 1964. The oil separators utilized on wastewaters containing settleables and floatables were built in 1940. The oil separators preceding "bio-flotation" were constructed in 1948. The "bio-flotation" facilities were placed in operation in 1960. Facilities for conveying plant sewage to the Whiting sewerage system were completed in 1948. Approximately $9,055,000 has been expended for pollution control facilities at the refinery.

American Maize Products Company, Hammond

The Company located in Hammond in 1905 and is a corn processing plant. Potable water, 0.7 mgd, is purchased from Hammond. Process water, 11 mgd, is pumped from Lake Michigan. All sewage, except from one warehouse toilet, and a small amount of concentrated process wastewater is discharged to the Hammond Sanitary District. The warehouse toilet is sewered to the process wastewater lagoon system. Treated process wastewaters are discharged to Lake Michigan. Treatment consists of anaerobic-aerobic lagoons. Many in-plant controls of wastewater have been provided as well as an in-plant wastewater monitoring system.

Prior to 1940, all wastewaters were discharged to Lake Michigan without treatment. In 1940, all sewage and some process wastewater was diverted to Hammond. Considerable in-plant equipment changes were made in 1949 and 1950 in order to reduce waste loadings to Lake Michigan. Raw water supply chlorination was instituted in 1950. Sufficient chlorine was applied to the raw water to maintain a chlorine residual in the effluent to Lake Michigan. Later, chlorine was also applied directly to the wastewater discharged to Lake Michigan.

During the late 1950's and early 1960's, the Company developed an anaerobic-aerobic lagoon system for treatment of wastewater prior to discharge to Lake Michigan. An experimental column trickling filter has been installed for continuing studies on the treatability of process wastewaters. The ultimate objective of the Company is to produce a plant effluent of 0.5 P.E. per bushel of corn processed. Approximately $1,340,000 has been expended by the Company for water pollution control facilities.

Commonwealth Edison Co., Inc., Stateline Generating Station, Hammond

The plant purchases potable water, 0.1 mgd, from Hammond and pumps process water, 1,007 mgd, from Lake Michigan. Process waters are chlorinated prior to use. A sewerage system was installed in 1920 for collection of sewage for discharge to the Metropolitan Sanitary District of Chicago. In 1949, an Imhoff tank with effluent chlorination was installed. The chlorinated effluent discharged to Lake Michigan until the Metropolitan Sanitary District connection became available in 1961. An ash disposal basin was constructed in 1946. The basin was later replaced in 1961 with bottom ash dewatering tanks. Fly ash is handled dry. Approximately $460,000 has been expended by the Company for water pollution control facilities.

LITTLE CALUMET RIVER-BURNS DITCH.

The Little Calumet River-Burns Ditch drainage basin includes the major land area of the Calumet Basin. Burns Ditch is a man-made drainage canal constructed in 1923 discharging to Lake Michigan. This ditch reversed the flow to the east in the Little Calumet River at about Broadway Street (Gary). The basin receives the treated effluent from the Chesterton, Crown Point, East Gary, Hobart, and Valparaiso sewage treatment plants. Sewage from Porter is not yet treated, but the Town is under Board order. Portage, New Chicago, Ogden Dunes and St. John do not have sewer systems.

The sewage treatment plants serving Chesterton, Hobart and Valparaiso provide adequate capacity, are well maintained and operated, and produce a good quality effluent. Improvements planned for construction at Crown Point this year will provide adequate capacity; good operation and maintenance will continue. Effluent chlorination is provided for all these plants.

The adequacy of the Gary-Miller District plant that is now serving East Gary is problematical. Plant additions, including effluent chlorination facilities, and improved operation and maintenance is required.

The start of construction of sewage works for Porter is scheduled for July 1, 1965.

Treated waste effluents from Midwest Steel and Bethlehem Steel plants discharge to Burns Ditch and the Little Calumet River, respectively. The effluent from Northern Indiana Public Service Company discharges to Lake Michigan.

There is no interstate pollution from the Little Calumet River-Burns Ditch drainage basin.

Crown Point

The City of Crown Point is served by sanitary and combined sewers. The 1960 population was 8,433; the plant was designed for a population of 7,500 and a flow of 0.8 mgd. The existing activated sludge-type sewage treatment facilities, including effluent chlorination, provide treatment for most of the present population. The plant provides approximately 85 per cent reduction in terms of 5-day B.O.D; the plant is fairly well operated and maintained. Approved plans for plant additions, including expanded chlorination facilities, will extend the capacity to 1.8 mgd. The plant effluent and stormwater overflow from combined sewers discharge to Bee Line Ditch, a tributary to Deep River and Burns Ditch.

On November 19, 1948, the Board issued a pollution abatement order with a compliance date of November, 1950. Plans were approved by the Board on January 26, 1951, and the project was placed under construction following the sale of $567,000 in sewer revenue bonds on April 24, 1951.

Due to the population growth in the area, extensions to the sewer system and treatment plant additions are required. Final plans for approximately 16,000 feet of interceptor sewers and plant additions were approved on July 21, 1964. The project is ready for construction bids and a Federal grant offer of $198,540 is available to help finance the project.

Hobart

The City of Hobart is served by a system of sanitary and combined sewers and an activated sludge-type sewage treatment plant including effluent chlorination facilities. The 1960 population was 18,680; the plant is designed for a population of 23,000 and a flow of 2.0 mgd. Primary treatment facilities were placed in operation in 1953 and secondary facilities were completed in 1962. The plant provides approximately 90 per cent reduction in terms of 5-day B.O.D the facilities are well maintained and operated. The effluent discharges to Deep River thence to Burns Ditch. Stormwater overflow from combined sewers discharge to Deep River and tributaries thereto.

On September 29, 1948, the Board issued a pollution abatement order to the City of Hobart. The City filed a petition to set the order aside. The case was finally heard on February 2, 1950, in Jasper Circuit Court. The court issued a decision upholding the Board's order.

Plans for a sewage works project were approved on February 27, 1951. On May 31, 1951, the Board approved a request for stage construction with primary facilities, plus chlorination, for the first stage. The project was placed under construction following the sale of $669,000 in revenue bonds on June 25, 1952.

Plans for secondary treatment facilities were approved on August 26, 1960. A revenue bond issue of $640,000, a Federal grant of $250,000 and cash on hand of $300,000 was utilized to finance the project. The expanded facilities were placed in operation in July, 1962.

East Gary

The City of East Gary (1960 population - 9,309) is served by combined and sanitary sewers. The sewage and wastes from this community are discharged to the Gary-Miller sewage treatment plant. The Gary-Miller trickling filter-type sewage treatment plant is designed to treat approximately 1.5 mgd. Effluent chlorination is not provided; the plant provides about 70 per cent reduction in terms of 5-day B.O.D. Plant effluent and stormwater overflow from combined sewers discharge to Burns Ditch.

On April 3, 1958, the City of East Gary signed an agreement with the Gary Sanitary District for treatment of East Gary sewage at the Gary-Miller District plant. On January 13, 1959, the Board approved plans for interceptor sewers, connection to the Miller District plant and improvements to the Miller District plant. The work, which was completed in 1960, was financed by East Gary with approximately $195,000 from the cumulative sewer fund.

It is estimated that the City has approximately 40,000 feet of combined sewers; since 1960, approximately 37,500 feet of sanitary sewers have been installed. In 1962, the City of East Gary was advised that effluent chlorination would be required. At that time, the Gary Sanitary District was planning a lift station and interceptor to divert the Gary sewage then discharged to the Miller plant to the Sanitary District's main plant, and it was indicated that East Gary would acquire the Miller plant. (The Gary sewage from this area is now discharged to the Gary Sanitary District's main plant.) On October 9, 1964, the State Board of Health advised East Gary that the Miller District plant was in poor condition and that laboratory and chlorination facilities were required. The last report from East Gary indicated that an early decision would be made on whether to acquire the Miller plant or effect an agreement for treatment of its sewage by the Gary Sanitary District.

New Chicago

The Town of New Chicago ~~(1960 population -- 2,~~312) is not served by a sewer system. The soil is predominantly sandy and individual sewage effluents are apparently absorbed into the ground.

In May, 1949, a preliminary report on a proposed water and sewer system was submitted. A public water supply has been installed; however, no progress has been made towards providing sewage works. An engineering survey was proposed in 1962;, further information has not been received.

Chesterton

The Town of Chesterton is served by a combined sewer system and an activated sludge-type sewage treatment plant with effluent chlorination facilities. The 1960 population was 4,192; the plant is designed for a population of 10,000 and a flow of 1.5 mgd. The plant provides approximately 90 per cent reduction in terms of 5-day B.O.D; the facilities are well maintained and operated. The effluent discharges to the Little Calumet River. Storm water overflow from combined sewers discharge to the Little Calumet River and tributaries thereto.

A letter from the Board dated April 4, 1952, recommended that preparation of plans for sewage treatment be authorized. In 1957, the Town instituted a cumulative sewage fund and in 1959 an engineer was employed for a survey of sewage works needs. Throughout this period, recommendations were made for a study to determine the feasibility of a sewage works to serve the Towns of Porter and Chesterton.

On January 23, 1962, plans for sewage treatment were approved and construction was started following the sale of a $720,000 revenue bond issue on June 28, 1962. The plant was placed in operation on April 1, 1963. Adequate capacity is available to serve the Town of Porter.

Valparaiso

The City of Valparaiso is served by a combined sewer system and an activated sludge-type sewage treatment plant. Effluent chlorination is provided. The 1960 population was 15,227; the plant is designed for a population of 20,000 and a flow of 2.0 mgd. The plant provides approximately 95 per cent reduction in terms of 5-day B.O.D; the facilities are well maintained and operated. The effluent discharges to Salt Creek, thence to the Little Calumet River and Burns Ditch. Storm water overflow from combined sewers discharges to Salt Creek and tributaries thereto.

A pollution abatement order was issued by the Board on July 29, 1948. A petition for review was filed by the City on August 18, 1948. After some delay and a change of venue, the Board's order was upheld by the Starke County Circuit Court on July 24, 1950.

Final plans were approved by the Board on March 25, 1952. The project was placed under construction after a revenue bond sale of $725,000; the plant was placed in operation in 1954. Additional sewers were constructed following a revenue bond issue of $1,450,000 in 1958.

A letter from the Board dated June 4, 1964, requested continuous chlorination of plant effluent and a chlorine residual of 1 mg/l. On June 9, 1964, the mayor advised that the City would comply with the Board's request. On January 5, 1965, the Board approved additions to chlorination facilities and recommended that the City authorize a study of sewer and sewage treatment plant improvement needs and that construction of facilities be undertaken to keep pace with community development.

Portage

The Town of Portage was incorporated in 1959. The area of 27 square miles had a 1960 population of 11,822. The Gary-Hobart Water Corporation is providing water to the area. A drainage project, to be partially financed by a $100,000 loan from the Indiana Flood Control Revolving Fund, is now under consideration. No municipal sewers are available.

The preliminary engineering report on sanitary sewers and sewage treatment, which was submitted January 25, 1962, proposed the installation of approximately 263,000 feet of sanitary sewers and a 1.25 mgd activated sludge-type sewage treatment plant to serve a population of 12,500. No progress has been made towards construction of sewage works.

The Portage Junior-Senior High School and Capitol Estates and Robbinwood Subdivisions, that are located within the corporate limits of Portage, provide activated sludge-type sewage treatment facilities with effluent chlorination. Robbinwood has chlorination facilities approved. The effluent from these plants discharges to Salt Creek and tributaries to the Little Calumet River.

Porter

The Town of Porter (1960 population - 2,189) is served by separate and combined sewers. The Town sewers discharge to the Little Calumet River. Sewage from 15 homes adjacent to the Chesterton sewage treatment plant is treated at that plant.

In 1961, the Town employed an engineer for a preliminary report and in 1962 and 1963 unsuccessful efforts were made to finalize an agreement for Porter to contract with Chesterton for sewage treatment.

On October 8, 1964, the Board ordered the Town of Porter to abate its contribution to the pollution of the Little Calumet River. Plans and specifications are due March 1, 1965; construction is to be started by July 1, 1965, and the facilities are to be completed by July 1, 1966.

Midwest Steel Company Division, National Steel Corporation, Portage

The Company pumps water from Lake Michigan and has a maximum pumping capacity of 52 mgd. Treated wastewaters are discharged to Burns Ditch. The plant started production in 1961. One of the outstanding industrial waste treatment plants in the country was provided as a part of original plant construction. Three separate sewer systems for conveying sewage, process wastewaters and cooling waters are utilized. All sewage receives activated sludge treatment with effluent chlorination prior to discharge to Burns Ditch. Treatment of process wastewaters consists of acid-alkali neutralization, oil emulsion breaking with coagulation and clarification, and mechanically equipped basins for removal of settleables and floatables. Concentrated chromium- and fluoride-bearing wastes are treated separately. A deep well disposal system was constructed in 1964 for underground disposal of waste pickle liquor and spent chromium-bearing solutions.

The plant effluent is routinely monitored by automatic samplers and laboratory analyses. In-plant controls, in compliance with Regulation SPC-2, to isolate concentrated cyanide solution tanks have been installed in the tin mill. The Board's 1961 approval of the process wastewater system was based on the final effluent meeting the following standards:

B.O.D.	10 mg/l	pH	5 to 10
Fluoride	2 mg/l	Suspended solids	40 mg/l
Zinc	15 mg/l	Floating material	No objectionable
Chromium	2 mg/l	Color	No objectionable
Cyanides	0.5 mg/l	Oils	15 mg/l

The effluent from the treatment facilities is consistently better than the standards approved by the Board.

No impairment of Burns Ditch or Lake Michigan has occurred as a result of the Company's wastewater. The operation of the wastewater treatment facilities has been excellent. About $6,025,000 has been expended for water pollution control facilities. It is expected that, when the Company installs basic steel and coking production units, equally extensive wastewater treatment will be provided.

Midwest Steel Company is an example of a new industry that has provided adequate water pollution control facilities to comply with requirements of the Board.

Bethlehem Steel Company, Inc., Burns Harbor Plant, Chesterton

The construction of the Burns Harbor plant is the most recent major industrial development in Indiana. Initial production began in 1964 and additional production facilities are under construction. Water is pumped from Lake Michigan. Treated wastewaters are discharged to the Little Calumet River, thence to Burns Ditch.

Separate sewers for conveying sewage, process wastewaters and cooling waters are, or will be, installed. All sewage receives activated sludge treatment and the effluent is chlorinated. The chlorinated effluent is discharged to a terminal lagoon for tertiary treatment. Treatment of process wastewaters consists of acid-alkali neutralization, emulsion breaking with coagulation and clarification, and mechanically equipped basins for removal of settleables and floatables. Concentrated chromium- and fluoride-bearing wastes will be treated separately. A deep well disposal system for underground injection of waste pickle liquor is under construction.

An 80-acre terminal lagoon system has been constructed for tertiary treatment of all wastewater other than cooling water. Final settling, reaeration and cooling will occur in the terminal lagoon. The lagoon spillway has been constructed so that additional reaeration will occur. Facilities for removing floatables from the lagoon have been installed.

The plant effluent will be routinely monitored by automatic samplers and laboratory analyses. In-plant controls, in compliance with Regulation SPC-2, to isolate concentrated cyanide solutions will be installed in the tin mill. The Board's approval of the process wastewater system was based on the final effluent meeting the following standards:

pH	5 to 10	B.O.D.	10 mg/l
Suspended solids	40 mg/l	Cyanides	0.2 mg/l
Oils	15 mg/l	Chromium	1.0 mg/l
Floating solids	No objectionable	Fluoride	1.5 mg/l
Color	No objectionable		

It is anticipated that the effluent will be of better quality than that approved by the Board.

About $7,000,000 has been expended for water pollution control facilities. It is expected that, when the Company installs basic steel and coking production units, equally extensive wastewater treatment will be provided.

Bethlehem Steel Company, Inc., is another example of a new industry that has provided adequate water pollution control facilities to comply with requirements of the Board.

Semi-Public

There are 32 semi-public sewage treatment plants in this drainage basin. Most of the subdivisions are served by package activated sludge sewage treatment plants. Operation and maintenance of many of the facilities is inadequate. The owners have been advised of the requirement for providing continuous effluent chlorination; however, in some instances, chlorination facilities are not available or, if available, not effectively operated. Plans have been approved for effluent chlorination facilities for the Lake County Home, north of Crown Point, and the Robbinwood Subdivision in Porter County.

The public schools in the area that have private sewage disposal facilities do not routinely provide adequate operation and maintenance. The two Indiana Toll Road treatment plants in the area are well maintained and operated.

At least five of the semi-public sewage treatment plants in and near the Merrillville Conservancy District will be abandoned when the District sewers now under construction are available. These include three Merrillville schools, a bowling alley and Chapel Manor Subdivision.

LITTLE CALUMET RIVER - WEST

The Little Calumet River Basin is divided into two drainage areas by Broadway Street in Gary. That area east of Broadway discharges to Lake Michigan through Burns Ditch. West of Broadway, the water flows into the Calumet-Sag Canal entering Illinois approximately 300 yards west of Hohman Avenue in Hammond.

The Little Calumet River receives sewage from Dyer and Schererville, a portion of the sewage from Griffith and Highland, and treated waste from Simmons Company. A U. S. Geological Survey recording gage on the Little Calumet River near the state line shows a minimum daily discharge of 1.9 cfs and a mean daily discharge of 7.3 cfs for August, 1964. Water quality monitoring data shows the stream to be polluted.

The sewerage project recently completed by the Hammond Sanitary District, completion of the sanitary sewage connection to Hammond by Griffith and Highland, and completion of the sewage works projects under construction by Dyer and Schererville will return the Little Calumet River flowing into Illinois to a satisfactory condition.

Storm water pumping facilities in Griffith, Highland, Munster and Gary and storm water overflow from combined sewers will continue to impose a bacteria and organic load on the Little Calumet River and tributaries thereto.

Dyer

The Town of Dyer (1960 population - 3,993) is served by sanitary and combined sewers. The project now under construction will provide interceptor sewers and an activated sludge type sewage treatment facility, including effluent chlorination, for a design population of 6,000 and a flow of 0.6 mgd. The effluent from the plant and storm water overflows will discharge to Hart Ditch, a tributary to the Little Calumet River.

The Board issued a pollution abatement order to the Town of Dyer on July 20, 1960; as constructive progress was not achieved, the case was referred to the Attorney General on July 18, 1961. Court action was deferred when the Town agreed to proceed with preparation of final plans. On November 21, 1963, plans and specifications were approved by the Board. After considerable delay, the project was placed under construction following the sale of $720,000 in revenue bonds on November 12, 1964. A Federal grant of $250,000 was approved to help finance the project.

Griffith

The Town of Griffith (1960 population - 9,483) is served by a combined sewer system. The dry weather sewage flow is pumped to the Hammond Sanitary District interceptor for treatment; storm water overflows from combined sewers are discharged to Cady Marsh Ditch and to the Little Calumet River.

The Board order for pollution abatement was issued on July 30, 1959. On June 16, 1960, the Town signed a contract for treatment of its sewage by the Hammond Sanitary District. Plans and specifications for interceptor sewers, lift station and connection to the Hammond Sanitary District were approved on August 26, 1960. A revenue bond issue of $1,440,000 was sold on April 12, 1962; a Federal grant of $250,000 was approved and $76,000 in cash was available to finance the project. Construction was completed in 1964 and pumping facilities were placed in operation to discharge dry weather flow to the Hammond interceptor sewer system for treatment.

Highland

The Town of Highland (1960 population - 16,284) is served by separate and combined sewers. The dry weather sewage flow from approximately 50 per cent of the population is pumped to the Hammond Sanitary District for treatment. Sewage and wastes from the remainder of the community, which are now discharged to Hart Ditch and the Little Calumet River, will be connected to Hammond Sanitary District interceptors by the project now under construction. Storm water overflows will continue to discharge to Hart Ditch and the Little Calumet River.

On December 14, 1945, the Board ordered the Town to provide sewage disposal facilities. On February 24, 1949, the Town requested annexation to the Hammond Sanitary District; however, annexation was not accomplished. In 1958, the Town signed an agreement with the Hammond Sanitary District for a connection to Hammond interceptors. On March 2, 1959, the Board approved plans for a sewage pumping station and force main connection which would discharge approximately 50 per cent of the Town's dry weather sewage flow to the Hammond interceptor sewer. The project, which was financed by a $175,000 general obligation bond issue and $125,000 from the cumulative sewer fund, went into operation in November, 1960.

In March, 1963, the Board requested a timetable for the completion of the necessary additional sewage works; on September 24, 1963, plans were approved for connection of the remainder of the sewage from Highland to the Hammond interceptor. A revenue bond issue of $580,000 was sold on February 2, 1965; a Federal grant of $229,500 was approved to help finance the project which is now under construction.

Munster

The Town of Munster (1960 population - 10,313) is served by sanitary and combined sewers; the dry weather sewage and waste flow is treated at the Hammond Sanitary District treatment plant. The Town of Munster was made a part of the District on January 26, 1948. Storm water overflow from combined sewers discharges to Hart Ditch and the Little Calumet River.

On December 14, 1945, the Board issued an order for pollution abatement to the Town. The compliance date was extended to January 1, 1948, on petition of the Town. After the Town was annexed to the Hammond Sanitary District, the Board advised the District it was expected to assume Munster's obligation.

On August 26, 1948, plans were approved for interception of existing sewers and connection to Hammond interceptors; however, financing of the project was delayed and actual connection was not made until December, 1953. Local developers continued to construct combined sewers with outfalls to the Little Calumet River; therefore, additional pollution was created. As provision was not undertaken for correction, the Board issued an order to the Hammond Sanitary District on September 21, 1961. On September 27, 1961, a petition for a court review of the order was filed by the Hammond Sanitary District; however, the petition was dismissed in 1962 and the District proceeded with plans for the construction of additional interceptor sewers. The project, which was financed by $592,000 in Sanitary District bonds and a $243,000 Federal grant, was completed early in 1964.

Schererville

The Town of Schererville (1960 population - 2,875) is primarily served by sanitary sewers. The project now under construction provides for the installation of approximately 75,000 feet of sanitary sewers and an activated sludge type sewage treatment facility, including effluent chlorination, to serve a design population of 6,000 and a flow of 0.86 mgd. The effluent from the plant will discharge to a tributary to Hart Ditch, thence to the Little Calumet River.

The Board issued a pollution abatement order to the Town of Schererville on August 28, 1962. Final plans and specifications for sewers and sewage treatment were approved on August 20, 1963. The project was placed under construction following the sale of an $850,000 revenue bond issue on March 18, 1964. In addition, a Federal grant of $250,000 was approved and $164,720 in cash was used to finance this project.

Simmons Company, Munster

Process and potable water is purchased from Hammond. Approximate water usage is 0.3 mgd. All sewage is discharged to the Hammond Sanitary District sewerage system. Treated process wastewaters are discharged to the Little Calumet River. Cyanide control facilities, in compliance with Regulation SPC-2, are provided within the plant. Process wastewaters are chemically treated to oxidize cyanides and reduce chromiums. Basins are provided to remove settleables including metal precipitates and floatables. Two-stage continuous alkaline-chlorination is provided for cyanide-bearing wastewaters. Sodium metabisulfite reduction plus lime neutralization is provided for chromium-bearing rinse waters. The discharge of treated process wastewaters to the river was approved by the Board in 1959. The approval was based upon the contaminants in the effluent not exceeding the following concentrations.

Cyanide	0 mg/l	Settleable Solids	None
Chromium	0.5 mg/l	pH	6.5 to 8.5
Oil	5 mg/l		

The Company has, in general, been meeting the effluent quality specified by the Board. Approximately $65,000 has been expended by the Company for pollution control facilities.

Semi-Public

The Dyer Elementary School and the Mount Mercy Sanatorium in Dyer will be connected to the Dyer municipal sewer system. The sewage treatment facilities serving the Wilbur Wright School in Munster will be abandoned and connection made to a Hammond Sanitary District sewer. St. Mary's Clericut in Schererville disposes of its sanitary sewage, after activated sludge treatment and chlorination, on its own grounds; however, if difficulty is experienced, connection could be made to the Schererville sewer system. Consideration is being given to connection of the St. John's Township schools, which are in the Burns Ditch drainage basin, to the Schererville sewer system.

With the completion of municipal sewer systems now under construction, it appears that all significant sources of sanitary wastes from semi-public installations in this drainage basin could feasibly be connected to municipal sewers.

GRAND CALUMET RIVER - WEST

The Grand Calumet River enters Illinois approximately 700 yards west of Hohman Avenue, Hammond. The divide in the river is approximately at Indianapolis Boulevard in Hammond (U.S. 12 and 20) although both easterly and westerly flows have been observed at this location. Generally, any discharges to the river west of the boulevard flow into Illinois and discharges east of the boulevard enter Lake Michigan via the Indiana Harbor Canal. There are no stream gaging stations on the Grand Calumet River in Indiana. Most of the flow at the state line consists of Hammond Sanitary District sewage treatment plant effluent. Some industrial wastes are also present. Water quality monitoring data show the stream to be polluted. The higher B.O.D.'s and coliform counts noted in 1963 and 1964 were caused by the bypassing of all or portions of the plant units during construction of improvements at the Hammond plant.

When effluent chlorination facilities are installed, the bacterial quality of the Grand Calumet River flowing into Illinois will be improved. However, it should be pointed out that during periods of storms, storm water overflow from combined sewers will impair bacterial quality and contribute some organic load to the stream.

Hammond

The Hammond Sanitary District provides interceptor sewers and sewage treatment for the City of Hammond and the Town of Munster within District boundaries and sewage treatment by contract for the Towns of Griffith and Highland and the City of Whiting. The 1960 tributary population of 155,915 is served by an activated sludge plant with a design population equivalent of 490,000 and a design flow of 36 mgd. The plant provides approximately 95 per cent reduction in terms of 5-day B.O.D.; in general, the operation and maintenance of the facilities is adequate. However, bypassing of all or portions of the sewage works, including pump stations and interceptors, during recent improvement projects contributed materially to the high coliform bacteria counts and organic loads noted in the Grand and Little Calumet Rivers. The majority of the area is served by combined sewers; as early as 1930, it was reported that Hammond had 155 miles of combined sewers. However, separate storm water systems serve an area with storm water discharge to Wolf Lake. Storm water pumping stations discharge to the Grand and Little Calumet Rivers, Wolf Lake and Lake Michigan. The Robertsdale pumping station discharges storm water overflow from combined sewers to Lake Michigan.

The activated sludge type sewage treatment facilities are located adjacent to Columbia Avenue and effluent is discharged to the Grand Calumet River. Under normal flow conditions, the flow is west to Illinois. Chlorination facilities are not provided; the Board has advised that chlorination of the effluent is required.

On October 14, 1937, the Indiana Department of Commerce and Industry ordered Hammond to abate pollution. On October 31, 1938, the Hammond Sanitary District was organized and construction of a $3,250,000 project was undertaken in 1939. The plant was placed in operation in August, 1941.

Plans for plant improvements were approved in 1959; a $4.1 million bond issue to finance plant improvements and relief sewers was sold November 10, 1959. Plans for additional interceptor sewers in Munster and plant additions were approved in 1961; construction was started in 1962 following a bond sale of $3,100,000. A Federal grant of $250,000 was approved for plant additions and a grant of $243,000 was made for Munster interceptor sewer project. In 1962 and 1963, approximately $10 million in sanitary district bonds were sold to finance interceptor, storm and storm relief sewers and pumping stations. A total of $22,913,000 has been spent to finance construction of sewage works, including interceptors and storm relief projects. A project slated for early construction will remove a bottleneck in a south side interceptor which has caused raw sewage bypassing to the Little Calumet River.

On September 2, 1964, a report on chlorination facilities was considered satisfactory by the Board and the District was requested to advise of action planned to install said facilities. The District has not submitted a timetable for construction of chlorination facilities.

Whiting

The City of Whiting (1960 population - 8,137) is served by a combined sewer system with provisions for discharge of dry weather sewage flow to the Hammond Sanitary District for treatment. A sewer outfall to Lake Michigan at Front Street and a storm water pumping station at Atcheson Avenue discharges, at times, sewage and storm water overflow to Lake Michigan.

On October 14, 1937, the Indiana Department of Commerce and Industry issued a final order to Whiting to abate pollution. An agreement for a connection to the Hammond Sanitary District was signed on February 19, 1945, and on April 25 the Board approved plans for connection of approximately two-thirds of Whiting's sewage to the District. On October 1, 1946, Whiting filed a stipulation with the U. S. Supreme Court agreeing either to construct a plant or connect all its sanitary sewage to the Hammond Sanitary District within two years. The stipulation pointed out that two-thirds of Whiting's sewage was discharged to Hammond.

On October 24, 1947, the Board approved plans for connection of the remainder of the sewage to Hammond; however, the work was not completed until December 5, 1949. Operation of the Front Street station was not satisfactory; on May 31, 1951, the Board approved plans for improvements. Intermittent discharge of raw sewage to Lake Michigan continued. A stipulation, in lieu of an order, was entered into by the Board and

Whiting on February 9, 1954. The City stipulated that necessary improvements to abate sewage discharge to Lake Michigan would be constructed. In 1954, a flood gate was installed on the Front Street lake outfall to keep lake water from entering the sanitary sewage pump station which was designed to discharge sewage to Hammond. The operation of the sanitary sewage pump station has not been satisfactory as raw sewage is still intermittently discharged to Lake Michigan.

Adolph Plating, Inc., East Chicago

The East Chicago plant of Adolph Plating Company is currently under construction. Plant operations will begin in 1965, and all plant sewage will be discharged to the East Chicago Sanitary District sewerage system. Untreated process wastewaters, 0.3 mgd, will be discharged to the Grand Calumet River. This project was approved by the Board on January 5, 1965, with the understanding that when water quality criteria for the river are established, the necessary waste treatment will be provided. In-plant cyanide control facilities, in compliance with Regulation SPC-2, will be provided.

LaSalle Steel Company, Hammond

All plant sewage is discharged to the Hammond Sanitary District sewerage system. Process wastes consist of 16,000 gallons per week of waste pickle liquor and pickling rinse waters. Waste pickle liquor is discharged twice a week to a mixing basin where a wire coating lime-dip solution is added for neutralization. Routine rinse waters are also discharged to the mixing basin. The neutralized wastes are discharged to the Grand Calumet River. Estimated Company expenditure for water pollution control facilities is $16,000.

Federal Cement Tile Company, Hammond

The Federal Cement Tile Company is served by a 7,500 gpd activated sludge type sewage treatment plant with effluent discharge to the Grand Calumet River near the Indiana-Illinois state line. It is the only semi-public sewage treatment facility in this sub-basin. The Company has been advised of the need for chlorination facilities.

WOLF LAKE

Wolf Lake is a natural lake located on the Indiana-Illinois state line which, in the past, drained into Lake Michigan. This outlet is now blocked and the lake discharges to the Calumet River in Illinois. There is very little outflow from the lake. The lake receives the effluent from Lever Brothers waste treatment facilities via Wolf Lake channel. This channel begins at the Lever outfall. The Board initiated enforcement actions against Lever Brothers and accepted a stipulation in 1957. After that date, complaints were received and fish kills occurred. In 1962, a hearing was held. As a result of this hearing, the Company has retained an engineer and studies are being conducted to determine necessary improvements.

The water quality of Wolf Lake, at the state line, is generally good and there is no interstate pollution of Wolf Lake.

Lever Brothers Company, Hammond

The Company located at Hammond in 1930. Potable water is purchased from Hammond and process water, 10.5 mgd, is pumped from Lake Michigan. All plant sewage and some industrial wastewater is discharged to the Hammond Sanitary District sewerage system. About 10 mgd. of treated process wastewater and cooling water is discharged to Wolf Lake.

Pollution of the channel which conveys the Company's wastewater to Wolf Lake is evident. This pollution neither extends into Wolf Lake proper nor does it cause interstate pollution of Wolf Lake. The Company's pollution of Wolf Lake Channel has been of concern to the Board for many years, and administrative hearings were scheduled in 1956 and 1961. A ten-day hearing was held in 1962. As a result of the 1962 hearing, the Company retained an engineer to review operations and make improvements where investigations indicate improvements are needed.

In 1944, the Company installed raw water chlorination equipment. Sufficient chlorine is added to maintain a residual in the wastewater discharged to Wolf Lake. In 1952, two air flotation units were installed. Two basins for removal of settleables and floatables are in use. Because of the relatively low "strength" of the total plant effluent, the Company has been reluctant to provide secondary biological treatment. The Company is attempting to improve in-plant waste prevention measures. About $750,000 has been expended by the Company for pollution control facilities.

CONCLUSIONS

1. The Great Lakes-Illinois River Basin report of the Department of Health, Education and Welfare is needed to establish water quality criteria for Lake Michigan. These criteria are absolutely essential to the determination of final sewage and waste treatment requirements.

2. The Board's Water Quality Monitoring Program has a sufficient number of stations to determine quality of the waters in the Indiana portion of the basin. The Department of Health, Education and Welfare's report for this conference recommends continuously recording monitors at selected locations and for selected indices. Monitors currently available have limitations on pollutants that can be measured, maintenance is difficult, and a careful investigation should be conducted before a decision is made on installation. If continuously recording monitors for the pollutants of concern are available, this would improve the data and make it more usable.

3. Major industrial plants should institute permanent effluent sampling programs. Data obtained from these programs should be submitted to the Board.

4. The O'Brien Lock should be placed in operation to provide more positive control of flow from Lake Michigan and reduce the reversal of flow from the Calumet River to Lake Michigan, which affects Indiana waters.

5. All municipalities, except Porter, are providing secondary treatment and some are providing effluent chlorination. The remainder of the municipal and the semi-public installations have been advised to provide effluent chlorination. The Board intends to take whatever action is necessary to obtain compliance.

6. The waters discharged from Burns Ditch to Lake Michigan and from Wolf Lake to Illinois do not contribute to interstate pollution.

7. When existing sewage works are augmented by facilities now under construction and planned, the waters of the Grand and Little Calumet Rivers where they cross the state line will be as good as modern sewage treatment practices can make them except during periods of storm water overflows.

8. The Grand Calumet River and Indiana Harbor Canal dry weather flow is practically all industrial cooling and process waters and waste treatment plant effluents. The origin and character of this flow must be considered in development of water quality criteria. Once the water quality is established, the Board will insist on the needed improvements.

9. The water quality monitoring records for the Whiting water plant for the past eight years, and for the Dickey Road station on the Indiana Harbor Canal for the past five years, show little if any deterioration of of water quality during those periods. This indicates the Board is holding the line on pollution even with increased industrial expansion and population growth.

10. The waters in Lake Michigan will improve once the Great Lakes-Illinois River Basin criteria have been established and additional treatment or waste reduction is provided.

11. A number of semi-public installations have been eliminated and connections made to municipal sewers. This is in compliance with a condition in the Board's approvals requiring connection when municipal sewers become available. The Board will press for the elimination of these installations as public sewer systems become available.

12. The Indiana law is adequate to achieve the desired water quality for the basin.

APPENDICES

Page

1 Letter of December 15, 1964, from the Secretary of Health. Education and Welfare 667
2 Letter of December 22, 1964, to the Stream Pollution Control Board Members 668
3 Letter from Technical Secretary, Stream Pollution Control Board to 17 cities and towns regarding conference participation 669
4 Letter from Technical Secretary, Stream Pollution Control Board to 33 industries regarding conference participation 672
5 Letter of December 29, 1964, from Technical Secretary, Stream Pollution Control Board to the Secretary of Health, Education, and Welfare 676
6 Abstract of Proposed Southern Lake Michigan Water Pollution Survey, Indiana-Illinois, 1953 677
7 Indiana Stream Pollution Control Law, Chapter 214, Acts of 1943, as amended 679
8 Regulation SPC 1 of the Stream Pollution Control Board 689
9 Regulation SPC 2 of the Stream Pollution Control Board 691
10 Regulation SPC 3 of the Stream Pollution Control Board 692
11 Letters of June and September, 1964, to the following industries: 693
    U. S. Steel Corporation, Gary Steel Works, Gary
    U. S. Steel Corporation, Gary Sheet and Tin Mill, Gary
    Youngstown Sheet and Tube Co., East Chicago
    Inland Steel Co., East Chicago
    Mobil Oil Co., East Chicago
12 Letters to 10 industries regarding taste and odor control at public water supplies 701
13 Analyses of Sampling Station, Grand Calumet River at Hohman Avenue bridge in Hammond 704
14 Analyses of Sampling Station, Little Calumet River at Hohman Avenue bridge in Hammond 706
15 Analyses of Sampling Station, Lake Michigan at the raw water intake of the Whiting water works 708
16 Analyses of Sampling Station, Grand Calumet River at the bridge on U.S. 12 710
17 Analyses of Sampling Station, Grand Calumet River at the bridge on Kennedy Avenue 711
18 Analyses of Sampling Station, Grand Calumet River at the bridge on Indianapolis Boulevard 712
19 Analyses of Sampling Station, Indiana Harbor Canal at the bridge on Columbus Drive 713
20 Analyses of Sampling Station, Indiana Harbor Canal at the bridge on Indianapolis Boulevard 714
21 Analyses of Sampling Station, Indiana Harbor Canal at the bridge on Dickey Road 715
22 Analyses of Sampling Station, Burns Ditch at the catwalk near mouth of Burns Ditch--Ogden Dunes 717

23 Analyses of Sampling Station, Wolf Lake Channel below Lever Brothers Company Plant 718
24 Analyses of Sampling Station, Burns Ditch at the bridge on Chrisman Road 719
25 Analyses of Sampling Station, Burns Ditch at the railroad trestle on the Mid-West Steel property, just north of U. S. 12 720
26 Industrial Waste Treatment and Control Facilities 721
27 Resume of Orders Issued to Calumet Area Municipalities 731
28 Status of Municipal Sewage Works, Calumet Area 738
29 Semi-public Sewage Disposal Facilities, Calumet Area 740
30 Letter dated January 11, 1965, from E. W. Young, Vulcan Materials Company 744
31 Letter dated September 18, 1964, from Technical Secretary, Stream Pollution Control Board, to the Department of Health, Education and Welfare, Region V, Chicago, Illinois 746

Appendix 1

THE SECRETARY OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON

DEC 15 1964

Dear Mr. Poole:

On the basis of reports, surveys, or studies, in accordance with section 8 of the Federal Water Pollution Control Act (33 U.S.C. 466 et seq.), I hereby call a conference in the matter of pollution of the interstate waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries (Indiana-Illinois). The conference will be held on Tuesday, March 2, 1965, at 9:30 a.m., C.S.T., Banquet Room, McCormick Place, South Lake Shore Drive, Chicago, Illinois.
Mr. Murray Stein of the Department of Health, Education, and Welfare has been designated as Chairman of the conference.

A copy of the technical presentation to be made at the conference by a representative of this Department will be supplied to you in ample time before the conference to permit analysis and evaluation.

Participation in the conference will be limited to representatives of the U.S. Department of Health, Education, and Welfare and such persons as are designated by your Board and the Illinois State Sanitary Water Board. You may bring such persons as you wish to the conference.

The conference will cover all interstate pollution problems of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries. As specified in the Act, we will furnish a summary of conference discussions to your Board and the Illinois State Sanitary Water Board.

Sincerely,

Secretary

Mr. B. A. Poole
Technical Secretary
Stream Pollution Control Board
State Board of Health
1330 West Michigan Street
Indianapolis, Indiana 46007

RECEIVED
DEC 17 1964
STATE OF INDIANA
STREAM POLLUTION CONTROL
BOARD

Appendix 2

STATE of INDIANA
INDIANAPOLIS 46207

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
MElrose 3-4420

-COPY-

December 22, 1964

STREAM POLLUTION CONTROL BOARD MEMBERS
Anson S. Thomas, Chairman
Lewis S. Finch, Vice-Chairman
Donald E. Foltz
Robert W. Kellum
J. Robert Mitten
A. C. Offutt, M. D.
Lt. Gov. Richard O. Ristine

Gentlemen:

Re: Conference Under Public Law 660 on
the Calumet Area - March 2, 1965

I received on December 17, 1964, a notice calling subject conference to be held by the Department of Health, Education and Welfare. For your information, a copy of this notice is enclosed.

It is the recommendation of the staff that all municipalities and industries with separate outfalls to waters named in the notice be invited to participate in the conference. This involves approximately 13 municipalities and approximately 21 industries. Each entity would be expected to present its own story of what it has done and what it expects to do in connection with its waste disposal.

I will call you the first of next week to see if you agree with the above proposal. If we are to invite municipalities and industries, the notices should go out before January 1.

Sincerely,

B. A. Poole
Technical Secretary

HDW/se
cc: Mr. Samuel Rosen
Deputy Attorney General

copied 2-65

Appendix 3

STATE of INDIANA
STREAM POLLUTION CONTROL BOARD
1816
INDIANAPOLIS 46207
1330 West Michigan Street
MElrose 3-4420

-C O P Y-

December 28, 1964

Gentlemen:

Attached hereto is a copy of a letter dated December 15, 1964, from Anthony J. Celebrezze, Secretary, Department of Health, Education and Welfare, calling a conference relative to pollution of the interstate waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries (Indiana-Illinois). You will note this conference will convene on Tuesday, March 2, 1965, at 9:30 a.m., CST, Banquet Room, McCormick Place, South Lake Shore Drive, Chicago, Illinois.

Also attached hereto is a copy of Section 8 of the Federal Water Pollution Control Act under which this conference is being called. You will observe from Secretary Celebrezze's letter that the conference is limited to representatives of the U. S. Department of Health, Education and Welfare, the Illinois State Sanitary Water Board, the Indiana Stream Pollution Control Board and such persons as are designated by the two state boards.

It is the purpose of this letter to advise you the Indiana Stream Pollution Control Board has designated your municipality as a participant in this conference. Will you please advise us, at your earliest convenience, of the name and title of your representative?

At the time of this writing we have not decided on the State of Indiana's presentation. Tentatively, we are considering limiting this presentation to a history of the development and installation of pollution abatement facilities in the Indiana Calumet district and to tabular data which depicts the current status of pollution abatement facilities at all industries maintaining separate outlets into the waters of the district and at all municipalities.

December 28, 1964

If we follow the scheme outlined above, this means you should consider going into some detail as to your own pollution abatement facilities and also into some specific statements on your plans for future work, if any. Naturally, you will be permitted to bring out anything else you consider pertinent to the subject under discussion.

You will observe a copy of HEW's technical presentation is to be made available to us in time to permit analysis and evaluation before the conference. If we can obtain sufficient copies of this from HEW, you will be supplied one as soon as it is available.

We also expect to have some discussions with HEW representatives within the next few days relative to the length of the conference contemplated, an agenda for the conference and certain other details. Following these discussions we will give you an approximation of the time which can be allotted for your presentation. If we receive other pertinent information this will also be supplied to you.

Since we will be expected to provide HEW with a list of the persons who will participate in this conference, please give us the name and title of your representative as soon as you can.

Sincerely yours,

B. A. Poole
Technical Secretary

BAP/se
Via Certified Mail
Enclosures

copied 2/65

Indiana Municipalities Designated to Participate in March 2, 1965 Conference Regarding Pollution of the Interstate Waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their Tributaries

City of Crown Point

City of East Chicago

City of East Gary

City of Gary

City of Hammond

City of Hobart

City of Valparaiso

City of Whiting

Town of Chesterton

Town of Dyer

Town of Griffith

Town of Highland

Town of New Chicago (P. O. Hobart)

Town of Portage

Town of Porter (P. O. Chesterton)

Town of Schererville

Merrillville Conservancy District (Gary)

Appendix 4

STATE of INDIANA
1816
INDIANAPOLIS 46207
STREAM POLLUTION CONTROL BOARD
1330 West Michigan Street
MElrose 3-4420

December 28, 1965

-COPY-

Gentlemen:

Attached hereto is a copy of a letter, dated December 15, 1964, from Anthony J. Celebrezze, Secretary, Department of Health, Education and Welfare, calling a conference relative to pollution of the interstate waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries (Indiana-Illinois). You will note this conference will convene on Tuesday, March 2, 1965, at 9:30 a.m., CST, Banquet Room, McCormick Place, South Lake Shore Drive, Chicago, Illinois.

Also attached hereto is a copy of Section 8 of the Federal Water Pollution Control Act under which this conference is being called. You will observe from Secretary Celebrezze's letter that the conference is limited to representatives of the U. S. Department of Health, Education and Welfare, the Illinois State Sanitary Water Board, the Indiana Stream Pollution Control Board and such persons as are designated by the two state boards.

It is the purpose of this letter to advise you the Indiana Stream Pollution Control Board has designated your corporation as a participant in this conference. Will you please advise us, at your earliest convenience, of the name and title of your representative?

At the time of this writing we have not decided on the State of Indiana's presentation. Tentatively, we are considering limiting this presentation to a history of the development and installation of pollution abatement facilities in the Indiana Calumet district and to tabular data which depicts the current status of pollution abatement facilities at all industries maintaining separate outlets into the waters of the district and at all municipalities.

If we follow the scheme outlined above, this means you should consider going into some detail as to your own pollution abatement facilities and also into some specific statements on your plans for future work, if any. Naturally you will be permitted to bring out anything else you consider pertinent to the subject under discussion.

You will observe a copy of HEW's technical presentation is to be made available to us in time to permit analysis and evaluation before the conference. If we can obtain sufficient copies of this from HEW you will be supplied one as soon as it is available.

We also expect to have some discussions with HEW representatives within the next few days relative to the length of the conference contemplated, an agenda for the conference and certain other details. Following these discussions we will give you an approximation of the time which can be allotted for your presentation. If we receive other pertinent information this will also be supplied to you.

Since we will be expected to provide HEW with a list of the persons who will participate in this conference, please give us the name and title of your representative as soon as you can.

Sincerely yours,

B. A. Poole
Technical Secretary

BAP/se
Via Certified Mail
Enclosures

copied 2/65

Indiana Industries Designated to Participate in March 2, 1965 Conference Regarding Pollution of the Interstate Waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their Tributaries

Chesterton

Bethlehem Steel Co., Inc.
Burns Harbor Plant
P. O. Box 248
Chesterton, Indiana

East Chicago

Adolph Plating, Inc.
5334 Indianapolis Blvd.
East Chicago, Indiana

American Steel Foundries
3761 Canal Street
East Chicago, Indiana

Blaw Knox Company
4407 Railroad Avenue
East Chicago, Indiana

Cities Service Petroleum Co.
P. O. Box 718
East Chicago, Indiana

E. I. du Pont de Nemours & Co.
5215 Kennedy Avenue
East Chicago, Indiana

General American Transportation
Corp., Plant #2
4245 Railroad Avenue
East Chicago, Indiana

Linde Air Company
Division Union Carbide
4400 Kennedy Avenue
East Chicago, Indiana

Mobil Oil Company
3821 Indianapolis Blvd.
East Chicago, Indiana

Sinclair Refining Company
3500 Indianapolis Blvd.
East Chicago, Indiana

Inland Steel Company
Indiana Harbor Works
East Chicago, Indiana

East Chicago - cont.

United States Gypsum Company
Canal Street and Riley Road
East Chicago, Indiana

U. S. S. Lead Refinery, Inc.
5300 Kennedy Avenue
East Chicago, Indiana

Youngstown Sheet and Tube Co.
Indiana Harbor Works
East Chicago, Indiana

Gary

Berry Refining Co., Inc.
P. O. Box 239
Gary, Indiana

Steiner Tissue Mills, Inc.
Second Place and Waite Street
Gary, Indiana

U. S. Steel Corporation
American Bridge Division
1 North Broadway
Gary, Indiana

U. S. Steel Corporation
Gary Sheet and Tin Mill
1 Broadway
Gary, Indiana

U. S. Steel Corporation
Gary Steel Works
1 Broadway
Gary, Indiana

U. S. Steel Corporation
National Tube Division
2400 East Mason Avenue
Gary, Indiana

Universal Atlas Cement Co.
Div. of U. S. Steel Corp.
Gary, Indiana

Indiana Industries

Hammond

Calumet Nitrogen Products Co.
1630 - 169th Street
Hammond, Indiana

Commonwealth Edison Co. of Ind., Inc.
State Line Station
P. O. Box 65
Hammond, Indiana

LaSalle Steel Company
1412 - 150th Street
Hammond, Indiana

Lever Brothers Company
1200 Calumet Avenue
Hammond, Indiana

Northern Indiana Public Service Co.
Baileytown Plant
5265 Hohman Avenue
Hammond, Indiana

Northern Indiana Public Service Co.
Gary Plant
5265 Hohman Avenue
Hammond, Indiana

Munster

Simmons Company
9200 Calumet Avenue
Munster, Indiana

Portage

Midwest Steel Company
Div. of National Steel Corp.
Portage, Indiana

Roby

American Maize-Products Co.
113th St. and Indianapolis Blvd.
Roby, Indiana

Whiting

American Oil Company
Whiting Refinery
2400 New York Avenue
Whiting, Indiana

Union Carbide Corporation
Chemicals Division
P. O. Box 750
Whiting, Indiana

Union Tank Car Company
1450 East 129th Street
Whiting, Indiana

Appendix 5

STATE of INDIANA
INDIANAPOLIS 46207

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
MElrose 3-4420

- C O P Y -

December 29, 1964

Mr. Anthony J. Celebrezze, Secretary
Department of Health, Education
and Welfare
Washington, D. C.

Dear Secretary Celebrezze:

Receipt is acknowledged of your notice of December 15, 1964, regarding the conference called on the matter of pollution of the interstate waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries (Indiana-Illinois).

Please be advised that the conferee of the Stream Pollution Control Board of the State of Indiana has not been selected to date. This will probably be done at the meeting of the Board on January 5, 1965. We have designated approximately 19 Indiana municipalities and 34 industries to be represented at and participate in the conference. We will provide you a list of these representatives at a later date when we are advised of the selections of the municipalities and industries.

We plan to provide each Indiana participant with a copy of HEW's technical presentation as soon as it becomes available. We trust that sufficient copies can be obtained from HEW.

We also expect to have some discussions with HEW representatives within the next few days relative to the length of the conference contemplated, an agenda for the conference and certain other details.

Sincerely yours,

B. A. Poole
Technical Secretary

RWH/rc
Via Air Mail - Certified
cc: Mr. Murray Stein
Mr. H. W. Poston
Regional Program Director, Region V
Water Supply and Pollution Control
Chicago, Illinois
Illinois Sanitary Water Board

copied 1/4/65-rc

Appendix 6

-COPY-

PROPOSED SOUTHERN LAKE MICHIGAN WATER POLLUTION SURVEY

INDIANA - ILLINOIS

1953 - 1954 - 1955

(Prepared for discussion purposes for use on May 22, 1953)

I. ABSTRACT

The ultimate aim of the proposed southern Lake Michigan survey is to obtain up-to-date reliable facts upon which to establish water quality objectives where these interstate waters are used or may be used for disposal of treated sewage and industrial wastes as well as for water supply.

The survey is to be financed and controlled by a committee representing all parties. The major portion of field and laboratory survey work will be accomplished by the co-operating interests utilizing proffered personnel and equipment. A special survey staff working full time will be required to plan, coordinate, obtain data, record and report findings.

It is recommended that a meeting of the several interests be arranged for the specific purpose of organization, assembling of available data, and solicitation of funds, personnel and field and laboratory equipment among the survey participants.

The general plan of the proposed survey is to place emphasis on determining the zones of influence in the southern end of Lake Michigan of the principal sources of pollution discharging directly into the lake. Minor pollution source effects will also be determined. To accomplish this will require systematic three-dimension sampling in the immediate area of each major outfall plus wherever the physical material forces such as wind, temperature, etc., cause the treated wastes to drift. Vertical as well as horizontal drifts must be followed. This has not been accomplished in previous surveys.

Intermingling of zones of influence are anticipated and it is deemed necessary to establish a three-dimensional grid system of lake sampling with key stations at and near each of the water supply intakes.

In order to obtain accurate lake water quality in the survey area, the proposed plan calls for daily sampling at perhaps 100 stations. Samples will be taken at as many depths as laboratory limitations permit. By analyzing wind, lake drifts, and results of analyses on a day-to-day or week-to-week basis, the daily sampling plan can be varied to eliminate "insignificant" stations. An attempt will be made to sample through all four seasons for two years. Sampling will be accomplished from launches and a helicopter. Ice cover effects will be studied.

One central laboratory for lake water examination is ideal, but utilizing space, equipment and personnel in two or more existing laboratories will be less costly. Establishment of a committee-owned and

Proposed Lake Michigan Pollution Survey (continued)

staffed-laboratory might be necessary. Major industries will be urged to measure, sample and analyze their own wastes.

In conjunction with the lake survey, it seems desirable to make a thorough pollution survey of the tributaries near the lake. State, municipal and industrial facilities should be utilized here.

The budget covering the two-year survey, based on a somewhat "ideal" plan, might reach $250,000, however, proffered equipment, personnel, etc., will reduce the over-all cost considerably.

copied 2-65

INDIANA STREAM POLLUTION CONTROL LAW

Chapter 214, Acts of 1943; amended by Chapter 132, Acts of 1945; and amended by Chapter 64, Acts of 1957

AN ACT creating the Stream Pollution Control Board of the State of Indiana, providing for its members, granting it control over the pollution of any waters of this State with the powers to make determinations, orders and regulations governing the same and prescribing the powers and duties of such Board; to prohibit the pollution of any waters of this State; to provide for the raising of funds by municipal corporations; to comply with the orders of the Board; and providing penalties for the violation thereof; and repealing certain laws.

SECTION 1. BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF INDIANA, That there is hereby created an administrative board to be known as "The Stream Pollution Control Board of the State of Indiana."

SEC. 2. The powers and duties of the Stream Pollution Control Board shall be vested in a seven (7) member board. The secretary of the Indiana State Board of Health, the Director of the Department of Conservation and the Lieutenant-Governor of the State of Indiana shall serve as ex-officio members of said Board. The remaining four (4) members of said board shall be appointed by the Governor for terms of four (4) years, no more than two (2) of which appointed members shall be of the same political party. The Governor shall fill any vacancy occurring in the appointed membership of the board for the unexpired term thereof and he may remove any such member for cause. Ex-officio members of the Board shall serve without additional compensation. Other members of the Board shall be paid mileage and a per diem of fifteen dollars ($15.00) for each and every day, or part of a day, in actual attendance at any meeting or hearing of the Board, which per diem and mileage shall be valid claims against the Division of Health and Preventive Medicine of the State Department of Health. The tenure of the present appointed members of the Board is saved and preserved. (As amended by Chapter 132, Acts of 1945, and Chapter 64, Acts of 1957.)

SEC. 3. The Board shall hold at least six (6) regular meetings each calendar year at a place and time to be fixed by the Board. The Board shall select at its first meeting following the passage of this Act, one of its members to serve as chairman and at the first regular meeting in each calendar year thereafter the chairman for the ensuing year shall

---

Note: The provisions of the Administrative Adjudication Act (Chapter 365, Acts of 1947, as amended) supersede certain procedures contained in the Stream Pollution Control Act. The former act pertains to the proceedings, orders and determinations of State officers and agencies and the judicial review thereof.

be selected. The secretary of the State Board of Health shall designate a qualified graduate sanitary engineer as technical secretary of the Stream Pollution Control Board. He shall receive no additional compensation for such services and during the interim between meetings of the Board he shall handle such correspondence, make or arrange for such investigations and surveys and obtain, assemble or prepare such reports and data as the Board may direct and authorize. Special meetings may be called by the chairman or by two (2) members of the Board by delivery of written notice at the office of each member of the Board. Four (4) members of the Board shall constitute a quorum. (As amended by Chapter 132, Acts of 1945.)

SEC. 4. The Stream Pollution Control Board shall have jurisdiction to control and prevent pollution in the waters of this State with any substance which is deleterious to the public health or to the prosecution of any industry or lawful occupation, or whereby any fish life or any beneficial animal or vegetable life may be destroyed, or the growth or propagation thereof prevented or injuriously affected.

SEC. 5. The Stream Pollution Control Board shall have the power to bring any appropriate action in law or in equity in the name of the State of Indiana as may be necessary to carry out the provisions of this act, and to enforce any and all laws and orders relating to the pollution of waters of this State, as hereinafter provided. Said Board shall have the power, after hearing as hereinbelow set out, to order any person, corporation, municipal corporation, partnership or legal entity to acquire, construct, repair, alter or extend such plants as may be necessary for the disposal or treatment of organic and/or inorganic matter which is causing, or contributing to, or about to cause or contribute to a polluted condition of the waters of this State. It shall have the power to require the sealing of mines, oil gas wells, brine wells or any other subterranean strata causing, contributing or about to cause or contribute to a polluted condition of the waters of this State.

SEC. 6. The Stream Pollution Control Board or any agent duly appointed by it shall have the right to enter at all reasonable times in or upon any private or public property, for the purpose of inspecting and investigating conditions relating to the pollution of any water of this State. The Stream Pollution Control Board shall have the power to call upon any State officer, board, department, school, university or other State institution, and the officers or employees thereof, and receive any assistance deemed necessary to the carrying out of the provisions of this act.

SEC. 7. The Stream Pollution Control Board shall have the power to determine what qualities and properties of water shall indicate a polluted condition of such water, in any of the streams or waters of this State, that shall be deleterious to the public health or to the prosecution of any industry or lawful occupation for which or in which any such waters may be lawfully used or employed, or whereby the carrying on of any agricultural, floricultural or horticultural pursuit may be or shall be injuriously affected, or whereby the lawful conduct of any livestock industry, or the use of any such waters for domestic animals may be prevented, injuriously affected or impaired, or whereby any lawful use of any such waters by the State of Indiana, or by any political subdivision, corporation, municipal corporation, association, partnership, person, or any other legal entity, may be lessened or impaired or materially interfered with, or whereby any fish life or any beneficial animal or vegetable life in said waters may be destroyed, or the growth or propagation thereof prevented or injuriously affected. Any such determination made by the said Stream Pollution Control Board as above provided, shall be filed of record in the office of the Stream Pollution Control Board. The Stream Pollution Control Board shall have the power to make regulations and orders restricting the polluting content of any waste material and polluting substances discharged or sought to be discharged into any of the streams or waters of this State. The Stream Pollution Control Board shall have the power to take appropriate steps to prevent any pollution which shall be deemed by the Stream Pollution Control Board to be unreasonable and against public interests, in view of the existing condition in any stream or other waters of this State.

SEC. 8. It shall be unlawful for any corporation, municipal corporation, association, partnership, person or any other legal entity to throw, run, drain, or otherwise dispose into any of the streams or waters of this State, or to cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise disposed into such waters, any organic or inorganic matter that shall cause or contribute to a polluted condition of such waters, according to any determination of the Stream Pollution Control Board, as provided for in Section 7 of this act, determining what shall constitute a polluted condition of such waters that shall be deleterious to the public health or to the prosecution of any industry or lawful occupation for which or in which any such waters may be lawfully used or employed, or whereby the carrying on of any agricultural, floricultural or horticultural pursuit may or shall be adversely affected, or whereby the lawful conduct of any livestock industry or the use of any such waters by or for domestic animals, may be prevented, injuriously affected or impaired, or whereby any lawful use of such waters by the State of Indiana or any political subdivision, corporation, municipal corporation, association, partnership, person, or any other legal entity, may be lessened or impaired or materially interfered with, or whereby any fish life or any beneficial animal or vegetable life in said waters may be destroyed, or the growth or propagation thereof prevented or injuriously affected.

SEC. 9. Whenever the Stream Pollution Control Board shall determine that any corporation, municipal corporation, association, partnership, person, or any other legal entity, is violating, or is about to violate, the provisions of Section 8 of this act, the Stream Pollution Control Board shall serve notice on the alleged offender by registered mail, of its determination of the fact of such violation, and shall include in such notice an order against such offender to cease such violation and to abate such condition of pollution, fixing in such notice and order a reasonable time within which such correction and abatement shall be accomplished. The notice of such determination and order shall be served upon the president and secretary of any corporation or association, upon the mayor and clerk, or clerk-treasurer, as the case may be, of any city, and upon the members of the board of trustees of any incorporated town, and in the case of municipal corporations, such notice and order also shall be published one time in a newspaper of general circulation in such municipal corporation. Within fifteen days from the receipt of notice of such determination and order, such offender may file with the Stream Pollution Control Board a full report showing what steps have been and are being taken to control such wastes or pollution, or a written brief showing cause why steps for correction or abatement are not being instituted, or such offender may, by written petition mailed by registered mail, or delivered in person to the Stream Pollution Control Board within such fifteen days, deny the fact of such violation or imminence of violation, and request a hearing on the issue of fact thus presented: PROVIDED, That in the case of a municipal corporation, any forty or more taxpayers or owners of real estate in such municipal corporation may, within fifteen days after publication of such notice and order as herein provided, by written petition mailed by registered mail or delivered in person to the Stream Pollution Control Board deny the fact of such violation or imminence of violation, and request a hearing on the issue of fact thus presented, regardless of any action that may have been taken by the proper officials of such municipal corporation, in response to said notice and order. If hearing is requested as herein provided, it shall be the duty of the Stream Pollution Control Board to set such matter for hearing, not less than ten and not more than sixty days from the date of receipt of such petition and request, and to send notice of time and place of such hearing to the petitioner, not less than ten days prior to the time fixed for such hearing, which notice shall be served by registered mail as herein provided, for service of the notice of determination and order: PROVIDED, However, that in case of request for hearing by forty or more taxpayers or owners of real estate, as herein provided, notice of time and place of hearing shall be served upon such petitioners by publication one time in a newspaper of general circulation in the municipal corporation affected by such determination and order. Such hearing shall be held in summary manner, and witnesses may be heard and evidence presented on the question of existence or imminence of such violation, only. Any member of the board shall have the power to compel the attendance of witnesses and to administer oaths, and all witnesses shall be examined under oath or affirmation. A full record shall be kept of the proceedings had, and evidence introduced, at such hearing, and a transcript of such proceedings and evidence, duly authenticated by the chairman and secretary of such board, shall be furnished by said board, on request, for use in any action to set aside a final order of said board, as provided in Section 11 of this act. Within fifteen days after completion of any such hearing, such board shall make written recommendation, relative to the affirmance, revocation or modification of the original determination and order of such board. When such alleged offender shall have filed a report showing what steps have been or are being taken to control such wastes, or pollution, or shall have filed a written brief showing cause why steps for correction or abatement are not being instituted, or where a hearing has been had and written recommendation made by such Board as herein provided, thereupon such Stream Pollution Control Board shall revoke, modify or affirm its original determination, and order and make such final order in the premises, as it shall then deem necessary and proper. Such final order shall be filed of record in the office of the Stream Pollution Control Board and notice of such final order shall be served on the alleged offender, as provided herein, for service of notice of the original determination and order of such board.

SEC. 10. That all plans and specifications for abatement or correction of any polluted condition shall be approved by the Stream Pollution Control Board. The Stream Pollution Control Board shall advise and consult, on request, with any person planning any correction or prevention of any pollution condition of any water of this State.

SEC. 11. In case any corporation, municipal corporation, association, partnership, person, or any other legal entity, against whom any final order of the Stream Pollution Control Board has issued, does not comply with said order within sixty (60) days from the date thereof, the said Board may commence an action for enforcement of said order against said party or parties against whom the order has been made, in the Circuit or Superior Court of the County in which such alleged violator resides. Such action shall be tried as a civil action de novo by such Court, and either party thereto shall be entitled to have the same tried before a jury. On such trial the Court shall have jurisdiction to determine whether said order is reasonable or unreasonable, and whether a polluted condition of any water or waters exists or is about to exist, and to affirm, modify, or wholly set aside such order, it being the intent and purpose of this Act that the finding of said Board as to whether a polluted condition of any water or waters exists or is about to exist is final only when so determined by such Court. Either party to such action may within thirty (30) days after judgment appeal to the Supreme Court of Indiana under the same procedure as governs appeals in ordinary civil actions.

SEC. 12. Any person, corporation, municipal corporation, partnership or legal entity, upon whom a final order of the Stream Pollution Control Board, as herein provided is served which order shall not have been set aside by a court of competent jurisdiction upon complaint filed as herein provided, or upon whom a final order is served as modified to conform with a judgment of such court directing modification, shall, within thirty days after receipt of such order, or after judgment affirming such order is entered, take steps for the acquisition or construction of such plants, machinery or works, or for such repair, alteration or extension of existing plants, machinery or works, as may be necessary for the disposition or treatment of the organic and/or inorganic matter which is causing or contributing to, or is about to cause or contribute to, a polluted condition of such water or waters, or shall take such other steps as may be necessary to comply with said final order of the Stream

Pollution Control Board. If the offender be a municipal corporation, the cost of acquisition, construction, repair, alteration or extension of the necessary plants, machinery or works, or of taking such other steps as may be necessary to comply with said order, shall be paid out of funds on hand available for such purposes, or out of the general funds of such municipal corporation, not otherwise appropriated; or if there not be sufficient funds on hand or unappropriated, then the necessary funds shall be raised by the issuance of bonds, such bond issue to be subject only to the approval of the Indiana Tax Board.

If the estimated cost of the steps necessary to be taken by such municipal corporation to comply with such final order of the Stream Pollution Control Board, is such that the bond issue necessary to finance such project would not raise the total outstanding bonded indebtedness of such municipal corporation, in excess of the constitutional limit imposed upon such indebtedness by the constitution of this State, then and in that event the necessary bonds may be issued as a direct obligation of such municipal corporation, and retired by a general tax levy to be levied against all the property within the limit of such municipal corporation listed and assessed for taxation. If the amount of such bonds necessary to be issued would raise the total outstanding bonded indebtedness of such municipal corporation above the said constitutional limitation on such indebtedness, or if such municipal corporation, by its common council or board of town trustees, as the case may be, should determine against the issuance of direct obligation bonds, then such municipal corporation shall issue revenue bonds and provide for the retirement thereof, in the same manner and subject to the same conditions as provided for the issuance and retirement of bonds in an act of the General Assembly of the State of Indiana entitled "An act to authorize cities and towns to construct, own, equip, operate, maintain and improve works, for the treatment and for the disposal of sewage; to authorize charges against owners of premises for the use of such works and to provide for the collection of same; to authorize cities and towns to issue revenue bonds, payable solely from the revenues of such works, and to make such bonds exempt from taxation and to make them lawful investments of sinking funds; to authorize contracts for the use of such works by other cities, towns and political subdivisions, and to authorize charges against owners of premises therein served thereby and declaring an emergency," approved August 17, 1932, as amended by Chapter 187 of the Acts of the General Assembly of Indiana, 1933, approved March 8, 1933, and as amended by an act of the 79th regular session of the General Assembly, such act as amended being sections 48-4301 to 48-4323, inclusive, of Burns' Indiana Statutes, Revision of 1933, insofar as the provisions of said act, as amended, are applicable and are not in conflict with any of the express provisions of this act: PROVIDED, However, that the provisions of Section 5 of the above mentioned act, as amended, allowing objections to be filed with the common council or board of town trustees by forty owners of property affected, and requiring the submission of the question of such bond issue and improvement to the qualified voters of such municipal corporation in certain cases shall not apply to bond issues proposed by any municipal corporation to comply with a final order issued by the Stream Pollution Control Board under the authority of this act, and such objections and/or submission to the qualified voters of such municipal corporation shall not be authorized, nor shall the same, if had, operate to justify or excuse failure to comply with such final order.

The funds made available by the issuance of either direct obligation bonds or revenue bonds as herein provided, shall constitute a sanitary fund, and shall be used for no other purpose than for carrying out such order or orders of the Stream Pollution Control Board.

SEC. 13. The construction, acquisition, improvement, equipment, custody, operation, repair and maintenance of any plant, machinery or works by any municipal corporation, in compliance with a final order of the Stream Pollution Control Board, as herein provided, other than the financing thereof, and the rights, powers and duties of such municipal corporation and the respective officers and departments thereof, whether the same be financed by the issuance of revenue or direct obligation bonds shall be governed by the provisions of an act entitled "An act to authorize cities and towns to construct, own, equip, operate, maintain and improve works, for the treatment and for the disposal of sewage; to authorize charges against owners of premises for the use of such works and to provide for the collection of same; to authorize cities and towns to issue revenue bonds payable solely from the revenues of such works, to make such bonds exempt from taxation and to make them lawful investments of sinking funds; to authorize contracts for the use of such works by other cities, towns and political subdivisions and to authorize charges against owners of premises therein served thereby; and declaring an emergency," approved August 17, 1932, as amended by Chapter 187 of the Acts of the General Assembly of Indiana, and as amended by an act of the 79th regular session of the General Assembly, such act as amended being sections 48-4301 to 48-4324, inclusive, Burns' Indiana Statutes, Revision of 1933, insofar as the provisions of said act, as amended, are applicable and not in conflict with any of the express provisions of this act: PROVIDED, However, that the provisions of Section 5 of the above named act, as amended, allowing objections to be filed with the common council or board of town trustees by forty owners of property affected, and are requiring the submission of the question of such bond issue and improvement to the qualified voters of such municipal corporation in certain cases, shall not apply to the construction, acquisition, equipping, improvement, repair or maintenance of any plants, machinery or works, by any municipal corporation, in compliance with a final order issued by the Stream Pollution Control Board under the authority of this act, and such objections and/or submission to the qualified voters of such municipal corporation, shall not be authorized, nor shall the same, if had, operate to justify or excuse failure to comply with such final order, nor shall any provisions of said above named act as amended, be deemed to allow such municipal corporation or any of the officers thereof, a discretion in the manner of complying with said order, but the same shall be mandatory: PROVIDED, Further, that the powers and duties conferred by the above named act, as amended, upon the boards of public works, or the committee or body authorized to perform the duties of a board of public works, in cities where there were no such boards at the time of passage of such act, shall be exercised and performed by the boards of public works and safety, as now constituted.

SEC. 14. It shall be the duty of each individual offender, and of each member of partnership, and of each member of the common council or board of town trustees of a municipal corporation, and of each member of the board of directors or other governing body of a private corporation, association or other legal entity, against whom a final order has been issued, as herein provided, to begin appropriate action or proceedings to comply with such order, within thirty days from the receipt thereof, if no action has been commenced in the circuit or superior court of the county where such violation is alleged to exist to set aside or vacate such order as provided in this act, or, in case such action has been brought, within thirty days from the date of judgment affirming such order, or from the date of receipt of such order, as modified in conformity with the judgment of such court. Failure of the common council or board of town trustees, in the case of a municipal corporation, or of the board of directors or other governing body of any private corporation, association or other legal entity, to provide for the financing and construction of such works as may be necessary to carry out said order by appropriate ordinance or resolution, shall constitute failure to begin appropriate action or proceedings to comply with such order, as above provided. Any individual offender, or any member of a partnership, or any officer or member of the board of directors of a private corporation, association or other legal entity, or any mayor, councilman, town trustee or member of a board of public works and safety, of any municipal corporation, who fails or refuses to discharge any duty imposed upon him by this act or by such final order of the Stream Pollution Control Board, or any duty imposed upon him by reason of any ordinance of the common council or board of trustees of any municipal corporation or resolution of the board of directors or other governing body of any private corporation, association or other legal entity, pursuant to this act or to such final order, may be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined in any sum not less than twenty-five dollars and not more than one hundred dollars, to which may be added imprisonment in the county jail for any period not to exceed ninety days.

SEC. 15. The Stream Pollution Control Board shall have the authority, in its discretion, to extend the time fixed in any final order issued by it, within which any offender is ordered to correct or abate a condition of pollution of any water or waters, upon written petition filed with such department not less than thirty days prior to the time fixed in such order, when it shall appear that a good faith effort to comply with said order is being made, and that it will be impossible for such offender to complete the project of work undertaken within the time so fixed. Any person, corporation, municipal corporation, partnership, association or other legal entity, who shall fail or refuse to correct or abate such polluted condition in compliance with such order within the time fixed or within the time additionally granted as herein provided, shall be subject to a penalty of one hundred dollars for each day that such polluted condition continues to exist after the time so fixed, or as additionally granted, which may be recovered in a civil suit brought in the name of the State of Indiana, and which penalty shall be in addition to the penalties provided in Section 14 of this act. It shall be the duty of the Attorney General to prosecute all actions for penalties under this section, and all penalties so recovered shall be paid into the common school fund of the State. The penalties accruing for any two or more days under the provisions of this section may be recovered in one complaint and may be joined in one paragraph of said complaint: PROVIDED, However, that no order of the Stream Pollution Control Board shall be enforceable in cases where material, supplies and labor are unavailable.

SEC. 16. Wherever the word "person" is used in this act, it shall be construed to mean and include person, persons, firm, partnership, corporation, municipal corporation, association and any and all other legal entities, whatsoever. Wherever the words "water" or "waters" shall be used in this act, they shall be construed to mean and include lakes, rivers, streams, drainage ditches, roadside ditches, underground water and any and all other surface and sub-surface water courses, underground reservoirs and basins within the jurisdiction of this state: PROVIDED, That the term "water or waters" shall not mean any privately-owned pond: PROVIDED, Further, that the provisions of this amendatory act shall in no way affect the administration and enforcement of the drainage and ditch laws of this state. (As amended by Chapter 64, Acts of 1957.)

SEC. 17. Being necessary for the public health, safety and welfare, this act shall be liberally construed to effectuate the purposes thereof.

SEC. 18. This act shall not be construed as repealing any existing law or any of the provisions of any existing law, relating to pollution of lakes or streams, or relating to the powers and duties of the State Board of Health, but shall be deemed and construed as auxiliary and supplementary thereto, excepting however, Chapter 152 of the Acts of 1935 which is hereby expressly repealed.

SEC. 19. Should any section or part of section of this act be held unconstitutional by any court of competent jurisdiction, the same shall not affect the validity of the act as a whole, or any part thereof, other than that portion so held to be unconstitutional.

SEC. 20. WHEREAS an emergency exists for the immediate taking effect of this act, the same shall be in full force and effect from and after its passage.

April. 1964

Appendix 8

INDIANA STREAM POLLUTION CONTROL BOARD

REGULATION SPC 1

WHEREAS, the Stream Pollution Control Board of the State of Indiana has the power under Section 7, Chapter 214, Acts of 1943, to determine what qualities and properties of water shall indicate a polluted condition of such water in any of the streams or waters of this State, and

WHEREAS, the Board recognizes the fact that the character of all surface water is affected by the mode of life of the people and the activities of industry, and that both the people and industry are dependent on said surface water to a greater or lesser extent, and

WHEREAS, it is recognized that concentrations of population may exist on small streams where diluting water is insufficient to maintain suitable concentrations of oxygen by the use of known and reasonable methods of waste treatment, and

WHEREAS, there is a fair economic balance between cost of treatment of waste and benefits received beyond which it is not reasonable to expend money for treatment, and the cost of treatment and the benefits to be derived must be considered in determining the extent of corrective treatment to be applied, and

WHEREAS, natural purifying agencies in the stream should be reasonably utilized, these agencies consisting primarily of the biology of the stream which is affected by the depth of the water, the velocity of the current, etc., and

WHEREAS, the necessary degree of purity of surface waters depends on the subsequent use which varies on different watersheds and at different points on the same watershed, and

WHEREAS, for the above-named reasons, each stream presents a separate problem and standards may need to be modified to fit specific cases,

BE IT RESOLVED, that in general the following regulations and standards shall be applicable to all receiving waters and any water which does not meet such standards and properties shall be deemed and considered as in a polluted condition.

1. Floating material including grease and oil shall not be discharged into any surface water in deleterious amounts, or in amounts sufficient to affect injuriously fish life, fur bearing or domestic animals, or the general biology of the water, or plant life in or in the vicinity of such water.

2. Waste which is discharged into any water shall contain nothing which will deposit in a stream or a lake to form putrescent or otherwise objectionable sludge banks.

3. Waste which is discharged into any water shall contain no materials in concentrations sufficiently high to affect adversely public health, fish life, fur bearing or domestic animals, or plant life in or in the vicinity of such water.

4. Generally the oxygen content of the receiving water, after being mixed

with and affected by the waste, shall be no less than 50 per cent saturation. A lower concentration will be tolerated temporarily, but only so long as it is not injurious to aquatic life, and in no case shall it fall below 25 per cent saturation.

5. Receiving waters shall be considered unsuitable for bathing if the coliform concentration exceeds 1000 per 100 ml. (MPN.) If the receiving water is used as a source of water supply, a coliform density greater than 5000 per 100 ml. (MPN.) shall not exist at or in the vicinity of the intake. Also in the case of wastes, bearing or producing substances objectionable from a taste or odor standpoint, which are discharged into waters which are used as a source of water supply, such wastes shall be so treated as to render them unobjectionable before discharge into the stream or lake.

(Effective November 8, 1945)

Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46207

INDIANA STREAM POLLUTION CONTROL BOARD

REGULATION SPC 2

Any person, firm or corporation engaged in manufacture or other process in which cyanides or cyanogen compounds are used shall have each and every room, where said compounds are used or stored, so constructed that none of said compounds can escape therefrom by means of building sewer, drain or otherwise directly or indirectly into any sewer system or water-course;

PROVIDED, however, that on application to and prior approval by the Stream Pollution Control Board, limited amounts, which it is determined would not be detrimental to public health or which would not pollute any lake, river, stream, drainage or roadside ditch or other water-course, shall not come under the provision of the paragraph above.

(Effective January 10, 1953)

Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46207

Appendix 10

INDIANA STREAM POLLUTION CONTROL BOARD

REGULATION SPC 3

Every person, firm, corporation or other legal entity who owns an active or abandoned coal mine or who is engaged in the storage, transportation, use, mining or processing of coal in the State of Indiana, shall dispose of refuse, including gob and coal fines, from processing coal, so as to create minimal acid mine drainage and deposits of coal fines in waters of this State.

No gob shall be used in the construction of public or private roadways in the State of Indiana, which will cause acid mine drainage to the waters of this State under the jurisdiction of the Stream Pollution Control Board of Indiana.

(Effective December 9, 1963)

Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46207

Appendix 11

STATE of INDIANA

INDIANAPOLIS 46207

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
MElrose 3-4420

- COPY -

June 22, 1964

U. S. Steel Corporation
No. 1 Broadway
Gary, Indiana

Attention: Mr. F. A. Dudderar, General Supt.
Gary Steel Works

Mr. T. J. Koening, General Supt.
Gary Sheet and Tin Mill

Gentlemen:

Re: Industrial Waste Survey
U. S. Steel Corporation, Gary

During the period of August through November, 1963, the U. S. Public Health Service conducted industrial waste surveys in the Indiana portion of the Calumet Area. These surveys were scheduled as part of the Great Lakes and Illinois River Basin Project (GLIRB) activities on streams tributary to Lake Michigan.

Enclosed for your information are copies of data obtained from the Public Health Service which relate to the operations of U. S. Steel Corporation, Gary.

Those data on Pages 1 and 2 of the enclosure are selected effluent loadings from municipalities and industries which discharge waste waters to the Grand Calumet River, Indiana Harbor Canal, and Lake Michigan. Those data on Pages 3 and 4 are selected stream loadings for the Grand Calumet River and the Indiana Harbor Canal. These data were obtained during 24- and 48-hour surveys except for those indicated on Page 3. Page 5 shows the chemical data as obtained from the GLIRB Project and which relate specifically to U. S. Steel's operations. These data were obtained with composite samples collected at the intersection of Bridge Street and the Grand Calumet River, Gary. Two 24-hour samples were composited over a 48-hour period on October 23 through October 25, 1963.

As you will observe, your plant discharges appreciable quantities of oil, phenol, ammonia, cyanide, etc., to the Grand Calumet River.

It is recommended that the U. S. Steel Corporation, Gary, actively study its problem and develop a comprehensive industrial waste treatment program for the abatement of water pollution in the Grand Calumet River. This program should include a timetable for the completion of each phase of the work anticipated.

It is requested that the comprehensive program be submitted to the Board for review and approval. The Board will have an engineer available, upon request, for consultation in regard to this matter. If we can be of service, please contact us.

Very truly yours,

B. A. Poole
Technical Secretary

RAW/msb
Enclosures
cc: Mr. G. A. Howell
Mr. H. W. Poston

copied 2/65

STATE of INDIANA

INDIANAPOLIS 46207

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
MElrose 3-4420

June 19, 1964

- COPY-

Youngstown Sheet and Tube Company
Indiana Harbor Plant
East Chicago, Indiana

Attention: Mr. J. W. Kirkpatrick
Manager, Chicago District

Gentlemen:

Re: Industrial Waste Survey

During the period of August through November, 1963, the U. S. Public Health Service conducted industrial waste surveys in the Indiana portion of the Calumet Area. These surveys were scheduled as part of the Great Lakes and Illinois River Basin Project (GLIRB) activities on streams tributary to Lake Michigan.

Enclosed for your information are copies of data obtained from the Public Health Service which relate to the operations of Youngstown Sheet and Tube Company, East Chicago.

Those data on Pages 1 and 2 of the enclosure are selected effluent loadings from municipalities and industries which discharge waste waters to the Grand Calumet River, Indiana Harbor Canal, and Lake Michigan. Those data on Pages 3 and 4 are selected stream loadings for the Grand Calumet River and the Indiana Harbor Canal. These data were obtained during 24-and 48-hour surveys except for those indicated on Page 3. Pages 5 through 14 are the total raw chemical data as obtained from the GLIRB Project and which relate specifically to Youngstown's operations. Pages 15 through 19 describe the location of the Youngstown sewers that were sampled during the survey.

As you will observe, your plant discharges appreciable quantities of oil, phenol, ammonia, cyanide, etc., to the Indiana Harbor Canal.

It is recommended that the Youngstown Sheet and Tube Company, East Chicago, actively study its problem and develop a comprehensive industrial waste treatment program for the abatement of water pollution in the Indiana Harbor Canal. This program should include a timetable for the completion of each phase of the work anticipated.

It is requested that the comprehensive program be submitted to the Board for review and approval. The Board will have an engineer available, upon request, for consultation in regard to this matter. If we can be of service, please contact us.

Very truly yours,

B. A. Poole
Technical Secretary

RAW/msb
cc: Mr. H. W. Poston
Mr. J. E. Kinney
Mr. A. J. Cochrane

copied 2/65

STATE of INDIANA

INDIANAPOLIS 46207

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
MElrose 3-4420

-COPY-

June 18, 1964

Inland Steel Company
Indiana Harbor Works
East Chicago, Indiana 46312

Attention: Mr. F. G. Jaicks, Vice-President
Manufacturing and Research

Gentlemen:

Re: Industrial Waste Survey

During the period of August through November, 1963, the U. S. Public Health Service conducted industrial waste surveys in the Indiana portion of the Calumet Area. These surveys were scheduled as part of the Great Lakes and Illinois River Basin Project (GLIRB) activities on streams tributary to Lake Michigan.

Enclosed for your information are copies of data obtained from the Public Health Service which relate to the operations of Inland Steel Company, East Chicago.

Those data on Pages 1 and 2 of the enclosure are selected effluent loadings from municipalities and industries which discharge waste waters to the Grand Calumet River, Indiana Harbor Canal, and Lake Michigan. Those data on Pages 3 and 4 are selected stream loadings for the Grand Calumet River and the Indiana Harbor Canal. These data were obtained during 24-and 48-hour surveys except for those indicated on Page 3. Pages 5, 6, and 7 are the total raw chemical data as obtained from the GLIRB Project and which relate specifically to Inland's operations. Pages 8 and 9 describe the location of the Inland sewers that were sampled during the survey.

As you will observe, your plant discharges appreciable quantities of oil, phenol, ammonia, cyanide, etc., to the Indiana Harbor Canal.

It is recommended that the Inland Steel Company, East Chicago, actively study its problem and develop a comprehensive industrial waste treatment program for the abatement of water pollution in the Indiana Harbor Canal. This program should include a timetable for the completion of each phase of the work anticipated.

It is requested that the comprehensive program be submitted to the Board for review and approval. The Board will have an engineer available, upon request, for consultation in regard to this matter. If we can be of service, please contact us.

Very truly yours,

B. A. Poole
Technical Secretary

RAW/msb
Enclosures
cc: Mr. I. Rosenak
Mr. R. L. Harbaugh
Mr. H. W. Poston

copied 2/65

STATE of INDIANA
INDIANAPOLIS 46207
1330 West Michigan Street
MElrose 3-4420
STREAM POLLUTION CONTROL BOARD

- COPY -

September 11, 1964

Mobil Oil Company
3821 Indianapolis Boulevard
East Chicago, Indiana

Attention: Mr. E. Kieper
Acting Plant Manager

Gentlemen:

Re: Industrial Waste Survey

During the period of August through November, 1963, the U. S. Public Health Service conducted industrial waste surveys in the Indiana portion of the Calumet Area. These surveys were scheduled as part of the Great Lakes and Illinois River Basin Project (GLIRB) activities on streams tributary to Lake Michigan.

Enclosed for your information are copies of data obtained from the Public Health Service which relate to the operations of Mobil Oil Company, East Chicago.

Those data on Pages 1 and 2 of the enclosure are selected effluent loadings from municipalities and industries which discharge waste waters to the Grand Calumet River, Indiana Harbor Canal, or Lake Michigan. Those data on Pages 3 and 4 are selected stream loadings for the Grand Calumet River and Indiana Harbor Canal. These data were obtained during 24- and 48-hour surveys except for those indicated on Page 3. Pages 5, 6, 7 and 8 list the total chemical data as obtained from the GLIRB Project and which relate specifically to Mobil Oil Company's operations.

As you will observe from the enclosed data, your plant discharges appreciable quantities of oil, phenol, solids, B.O.D., ammonia, etc., to the waters of the Indiana Harbor Canal.

It is recommended that the Mobil Oil Company, East Chicago, actively study its industrial waste problem and develop a comprehensive industrial waste treatment program. This program should include a timetable for the completion of each phase of the work anticipated.

Mobil Oil Company

September 11, 1964

It is requested that the comprehensive program be submitted to the Board for review and approval. The Board will have an engineer available, upon request, for consultation in regard to water quality goals. Please advise this Board of the action that has been taken in regard to this matter.

Very truly yours,

B. A. Poole
Technical Secretary

RAW/msb
Enclosure
cc: Mr. J. W. Mann
Mr. H. W. Poston

copied 2/65

Appendix 12

STATE of INDIANA

INDIANAPOLIS 46207

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
MElrose 3-4420

- COPY -

December 15, 1964

Gentlemen:

Re: Lake Michigan

Water quality in the southern end of Lake Michigan is of the utmost concern to this Board. You are aware of the past litigation in the Supreme Court of the United States against the State of Indiana, Hammond, Gary, East Chicago, Whiting and 19 industries for pollution of Lake Michigan. Currently, the Public Health Service is preparing a comprehensive report for Lake Michigan. All of this is indicative of the interest and concern about the present and future quality of Lake Michigan water.

For many years, the City of Chicago has communicated through the Chicago Water Department its unhappiness with the quality of Lake Michigan water, particularly the high threshold odors. High threshold odor water requires treatment with high dosages of activated carbon. Needless to say, Indiana industry has been blamed and, in a large number of the cases, is probably responsible.

The daily operation reports of the Hammond, Whiting, East Chicago and Gary water treatment plants have been studied. The daily average carbon used per million gallons (MG) of water treated have been plotted for a number of years. These plots for Hammond show the use of carbon is high in the winter months generally from November through March. This spring (1964) carbon usage remained high through April and then dropped in May, June and the first half of July. Since July 13 the curve has been on the upswing with peak days above 100 pounds per MG on two days in August, nine days in September and 12 in October, which is the first time since 1959 this has occurred in September and October. Enclosed is a table that gives by month and year the average monthly use of carbon per MG, and the number of days each month the dosage exceeded 100 pounds per MG and 200 pounds per MG.

Several times each year the carbon dosage exceeds 300 pounds per MG with a high of 651 pounds per MG on March 5, 1960. Such occurrences before December or January are unusual, and have been recorded before December 1 only twice since 1959 - November 13, 1962 (316) and October 28, 1961 (300). However, there are three days in November of this year (1964) which are as follows: 382 on November 1, 334 on November 12, and 446 on November 23.

These data indicate the pollution situation in Lake Michigan is worse than it has been in the past several years. If the present trend continues, we can expect conditions to be as bad or worse than 1959 which was before many of the waste treatment facilities were in operation.

You are requested (1) to redouble your efforts to improve housekeeping by eliminating or holding to an absolute minimum the wastes discharged to plant sewers, (2) to eliminate the dumping of wastes or non-saleable compounds to the sewers and water courses, and (3) to improve where possible the operation of existing treatment works.

Please advise this Board of the action you have taken to improve water quality in Lake Michigan.

Very truly yours,

B. A. Poole
Technical Secretary

Encl.

Copies to:

Cities Service Petroleum Co., East Chicago
Inland Steel Company, East Chicago
Mobil Oil Company, East Chicago
Sinclair Refining Company, East Chicago
Youngstown Sheet and Tube Co., East Chicago
U. S. Steel Corporation, Gary Sheet & Tin Mill, Gary
U. S. Steel Corporation, Gary Steel Works, Gary
American Maize-Products Co., Hammond
American Oil Company, Whiting
Union Carbide Corporation, Whiting

copied 2/65

Hammond, Indiana
Carbon Used
Monthly Average
Pounds Per Million Gallons

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov. *	Dec.
1964	108	95	90	100	72	54	58	72	88	97	114	
1963	127	144	59	72	64	70	68	58	60	58	80	114
1962	104	67	71	49	50	52	63	49	48	52	107	79
1961	127	141	89	75	61	52	67	60	56	56	76	75
1960	134	230	189*	81	80	66	57	54	52	64	63	89

Days Carbon Used
Greater Than 100 Pounds Per Million Gallons

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1964	13	5	7	9	2	0	1	2	9	12	* 6	
1963	18	12	4	6	0	0	1	0	0	0	9	7
1962	12	1	2	1	1	1	2	0	0	2	12	6
1961	11	19	9	5	1	0	2	0	0	1	5	7
1960	16	23	18	8	9	1	1	0	0	3	2	10

Days Carbon Used
Greater Than 200 Pounds Per Million Gallons

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1964	2	3	1	2	1	0	0	0	1	0	* 2	
1963	4	5	0	0	0	0	0	0	0	0	0	5
1962	6	1	1	0	0	0	0	0	0	0	3	1
1961	8	3	3	0	0	0	0	0	0	1	1	0
1960	6	12	12	0	0	0	0	0	0	0	0	1

* Data Through November 21, 1964

WATER QUALITY - CALUMET AREA
GRAND CALUMET RIVER - HOHMAN AVENUE

Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl⁻ mg/1	Nitrates as N mg/1	pH	Spec. Cond. umhos./1cm	Hardness as CaCO₃, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.
1958												
Max.	298	52	5.2	8.1	1031	496	60	125	608	200	55.0	24,000,000
Min.	102	15	0.1	7.4	561	244	10	0	14	5	3.4	43,000
Ave.	197	39	2.3	7.6	840	325	25	35	86	40	12.1	2,600,000
Med.											9.0	330,000
1959												
Max.	298	71	3.8	8.0	1027	406	40	250	300	120	64.0	240,000,000
Min.	150	40	0.0	7.2	662	248	10	15	17	15	9.0	43,000
Ave.	215	52	1.4	7.5	849	318	25	55	70	44	23.8	24,000,000
Med.											16.8	2,300,000
1960												
Max.	268	76	9.4	8.6	1200	440	100	250	184	115	83.0	120,000,000
Min.	146	25	0.3	6.8	471	130	15	10	5	5	2.7	30,000
Ave.	201	54	3.3	7.6	899	326	30	52	51	30	21.7	11,000,000
Med.											11.0	2,300,000
1961												
Max.	244	70	11.4	8.0	1055	490	50	125	114	59	29.0	11,000,000
Min.	166	30	0.2	7.0	750	204	10	10	12	4	3.0	23,000
Ave.	197	56	3.5	7.4	881	314	25	40	39	23	15.7	2,000,000
Med.											12.0	930,000
1962												
Max.	364	104	3.0	8.2	1152	412	50	300	716	312	150.0	6,700,000
Min.	156	52	0.0	7.2	774	240	5	10	11	16	4.0	50,000
Ave.	217	71	0.9	7.4	989	324	20	95	147	68	35.0	1,000,000
Med.											33.0	430,000

GRAND CALUMET RIVER-HOHMAN AVENUE(Continued)

Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl - mg/1	Nitrates as N mg/1	pH	Spec. Cond. umhos./1cm	Hardness as CaCO$_3$, mg/1	Color	Turbidity	Susp. Scl. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform pur 100 ml.
1963												
Max.	276	115	13.0	8.2	1177	376	60	550	1160	600	380.0	32,000,000
Min.	146	28	0.0	6.8	594	190	15	10	15	10	13.0	10,000
Ave.	225	71	1.8	7.4	940	315	40	115	151	96	90.0	22,000,000
Med.											67.0	16,000,000
1964												
Max.	258	108	12.0	7.7	1221	366	80	270	130	130	100.0	43,000,000
Min.	112	37	0.0	7.0	596	260	15	15	8	2	5.0	40,000
Ave.	188	69	2.9	7.3	939	312	35	125	72	48	47.3	12,230,000
Med.											60.0	54,000

WATER QUALITY - CALUMET AREA
LITTLE CALUMET RIVER - HOHMAN AVENUE

Date	Alk. (total) as CaCO, mg/1	Chlorines as Cl⁻ mg/1	Nitrates as N mg/1	pH	Spec. Cond. umhos./1cm	Hardness as $CaCO_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.
1958												
Max.	314	48	4.4	8.2	1058	508	55	120	400	204	30.0	4,300,000
Min.	110	10	0.1	7.5	496	292	10	0	10	3	1.2	4,300
Ave.	237	31	1.1	7.7	880	383	30	22	54	23	7.9	500,000
Med.											6.3	230,000
1959												
Max.	450	46	2.9	8.4	989	455	50	260	118	58	14.2	9,300,000
Min.	56	11	0.2	7.3	304	128	25	10	10	0	2.5	3,000
Ave.	221	26	1.4	7.7	788	374	30	30	39	14	5.4	720,000
Med.											5.3	93,000
1960												
Max.	364	55	6.8	8.7	1042	460	70	420	362	42	18.0	24,000,000
Min.	70	9	0.2	7.3	369	158	15	5	4	4	2.0	2,300
Ave.	247	30	1.5	7.9	849	394	30	51	46	16	6.3	1,600,000
Med.											5.2	230,000
1961												
Max.	312	59	4.2	8.1	1133	452	60	1000	598	100	13.0	11,000,000
Min.	66	10	0.2	7.0	555	160	10	10	10	4	2.0	4,300
Ave.	212	33	1.6	7.7	858	373	30	90	67	16	6.3	1,600,000
Med.											5.0	430,000
1962												
Max.	343	45	4.2	8.0	1115	446	50	290	83	35	150.0	480,000
Min.	128	19	0.1	7.2	557	232	25	10	4	1	0.9	28,000
Ave.	247	36	1.1	7.7	857	376	30	45	29	14	17.5	270,000
Med.											6.3	210,000

LITTLE CALUMET RIVER - HOHMAN AVENUE (Continued)

Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl⁻ mg/1	Nitrates as N mg/1	pH	Spec. Cond. μmhos./1cm	Hardness as CaCO$_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.
1963												
Max.	350	86	6.0	8.5	1196	480	60	80	84	36	36.0	3,900,000
Min.	126	36	0.0	7.3	696	218	5	5	27	4	3.0	1,000
Ave.	219	51	1.0	7.6	911	377	35	30	5	15	15.4	890,000
Med.											11.0	420,000
1964												
Max.	310	87	6.8	8.0	1189	464	50	190	102	70	19.0	7,900,000
Min.	146	22	0.0	7.2	674	274	10	10	8	4	4.0	30,000
Ave.	245	56	1.2	7.6	925	380	30	40	41	17	8.7	1,200,000
Med.											9.7	400,000

Appendix 15

WATER QUALITY - CALUMET AREA
LAKE MICHIGAN - WHITING

Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl$^-$ mg/1	Nitrates as N mg/1	pH	Spec. Cond. ^{u}mhos./1cm	Hardness as CaCO$_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.
1957												
Max.	114	8	0.9	8.3	298	138	5	125	53	18		
Min.	106	4	0.2	7.7	253	126	3	5	3	0		
Ave.	109	6	0.4	8.1	279	132	5	25	14	5		
Med.					*530							
1958												
Max.	122	10	1.6	8.4	316	148	10	25	82	14	3.2	43,000
Min.	107	6	0.0	7.3	264	130	0	0	2	1	1.0	<30
Ave.	114	7	0.3	8.0	284	136	5	5	16	4	1.6	8,700
Med.											1.5	4,300
1959												
Max.	188	14	0.7	8.3	509	252	20	15	39	11	2.6	23,000
Min.	102	5	0.0	7.5	254	128	5	5	0	0	0.8	<30
Ave.	116	8	0.4	7.9	300	144	10	10	11	5	1.4	4,700
Med.											1.1	430
1960												
Max.	130	26	1.8	8.5	313	318	15	30	38	16	5.0	23,000
Min.	94	7	0.1	7.3	272	132	65	5	1	1	0.2	< 30
Ave.	113	9	0.4	8.0	293	151	5	12	14	5	1.4	3,471
Med.											1.0	1,200
1961												
Max.	126	14	1.9	8.4	428	214	15	40	44	13	4.4	43,000
Min.	106	5	0.1	7.4	263	128	5	5	2	1	0.6	< 30
Ave.	117	8	0.4.	7.9	292	150	5	10	12	5	1.4	4,000
Med.											1.2	430

* These figures are not included in average.

LAKE MICHIGAN - WHITING (Continued)

Date	Alk. (total) as CaCO, mg/l	Chlorides as Cl^- mg/l	Nitrates as N mg/l	pH	Spec. Cond. ^{u}mhos./1cm	Hardness as $CaCO_3$, mg/l	Color	Turbidity	Susp. Sol. mg/l	Vol. Susp. Sol. mg/l	B.O.D. mg/l	Coliform per 100 ml.
1962												
Max.	144	13	2.1	8.4	365	202	10	20	56	12	3.8	6,400
Min.	102	3	0.1	7.5	252	126	0	5	1	0	0.4	100
Ave.	114	8	0.3	8.0	296	146	5	5	11	5	1.9	1,100
Med.											1.3	700
1963												
Max.	170	38	1.3	8.4	336	178	10	25	27	17	5.3	47,000
Min.	100	2	0.0	7.0	256	134	5	5	2	1	0.9	100
Ave.	118	8	0.3	7.7	302	147	5	5	10	5	1.8	5,600
Med.											1.4	1,000
1964												
Max.	122	11	0.7	8.0	333	148	15	305	37	9	5.2	7,000
Min.	100	1	0.1	7.0	183	110	0	0	2	0	0.6	10
Ave.	110	7	0.3	7.7	265	136	5	20	10	4	2.0	1,400
Med.											1.5	400

WATER QUALITY - CALUMET AREA
GRAND CALUMET - U.S. 12

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl^- mg/1	Nitrates as N mg/1	pH	Spec. Cond. μmhos./1cm	Hardness as $CaCO_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.	Temp.--C°	Diss. Oxygen mg/1	Diss. Oxygen % Sat.	pH
1960																
Max.	252	33	4.6	8.0	426	330	50	130	148	48	14.0	4,300,000	32	8.0	72	6.6
Min.	60	15	0.6	6.8	328	152	5	15	18	0	1.2	23,000	11	1.5	20	7.2
Ave.	122	19	2.1	7.6	386	186	20	50	46	16	7.9	105,000	24	3.9	45	7.8
Med.											7.3	93,000				
1961																
Max.	148	27	3.3	7.9	557	198	40	130	98	60	29.0	24,000,000	33	8.5	79	6.0
Min.	70	12	0.5	7.0	350	146	0	10	10	3	3.7	23,000	10	1.0	13	7.0
Ave.	115	18	1.6	7.4	405	169	15	40	43	16	11.6	140,000	19	5.0	50	7.5
Med.			*11.2						*147		9.1	230,000				
1962																
Max.	142	28	4.6	8.0	496	406	25	110	79	36	40.0	1,700,000	35	8.0	72	8.2
Min.	58	5	0.3	6.6	313	146	0	10	5	0	2.3	2,000	6	1.4	13	6.8
Ave.	112	17	1.5	7.5	406	180	10	45	45	15	11.9	150,000	20	4.4	47	7.6
Med.											11.0	43,000				
1963																
Max.	180	40	3.1	8.1	653	316	30	50	52	26	24.0	930,000	31	6.3	68	8.4
Min.	38	10	0.0	7.0	319	142	5	5	0	0	3.0	1,000	7	0.9	9	6.8
Ave.	118	15	0.9	7.5	386	178	10	20	29	11	10.5	194,000	22	3.7	44	8.0
Med.											11.0	23,000				
1964																
Max.	134	17	2.5	7.9	418	180	50	100	84	28	14.0	2,900,000	34	11.1	107	8.1
Min.	60	5	0.0	6.7	327	80	0	10	24	0	3.0	1,000	10	0	0	6.9
Ave.	108	14	0.6	7.2	370	158	10	40	39	13	7.8	390,000	22	6.0	66	7.2
Med.											7.3	40,000				

* These figures are not included in average.

WATER QUALITY - CALUMET AREA
GRAND CALUMET RIVER - KENNEDY AVENUE

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl$^-$ mg/1	Nitrates as N mg/1	pH	Spec. Cond. umhos./1cm	Hardness as CaCO$_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/1	Diss. Oxygen % Sat.	pH
1960																
Max.	124	31	2.3	7.9	421	192	60	70	74	29	33.0	4,300,000	32	4.0	53	8.4
Min.	80	13	0.3	7.1	287	98	5	7.5	21	7	3.0	7,300	12	0.0	0	7.0
Ave.	86	17	1.0	7.5	376	160	25	30	44	15	11.4	780,000	24	1.8	22	7.7
Med.											10.0	230,000				
1961																
Max.	124	27	3.4	7.8	629	222	20	180	134	29	16.0	9,300,000	28	6.5	62	7.8
Min.	88	10	0.2	6.6	372	160	5	10	9	2	4.0	4,300	11	1.2	11	6.8
Ave.	111	19	0.9	7.3	453	181	15	40	46	13	8.5	820,000	19	3.4	36	7.4
Med.										*100	8.0	230,000				
1962																
Max.	134	28	3.2	7.9	871	194	25	250	152	84	70.0	770,000	36	7.2	58	8.0
Min.	58	9	0.3	6.7	324	146	5	10	20	2	2.7	1,500	6	1.0	10	6.8
Ave.	110	18	1.0	7.4	451	168	10	45	45	19	11.5	120,000	21	3.4	35	7.7
Med.											8.9	32,000				
1963																
Max.	188	29	2.4	7.7	955	370	40	40	73	60	40.0	2,400,000	31	6.0	56	8.6
Min.	72	12	0.0	6.8	339	154	5	5	0	0	1.0	3,000	10	0.0	0	7.6
Ave.	113	18	0.6	7.4	498	186	15	15	22	10	9.2	380,000	22	2.4	25	8.0
Med.		*66	*6.5								5.7	120,000				
		*67														
1964																
Max.	132	32	1.2	7.9	568	366	20	100	85	33	16.0	4,900,000	34	9.0	85	7.5
Min.	0	5	0.0	6.8	346	146	5	10	10	2	1.4	1,000	10	0.0	0	6.8
Ave.	102	18	0.4	7.2	426	176	5	40	33	12	7.5	860,000	21	3.6	38	7.2
Med.				*3.9							6.3	210,000				

* These figures are not included in average.

WATER QUALITY - CALUMET AREA
GRAND CALUMET RIVER - INDIANAPOLIS BOULEVARD

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/l	Chlorides as Cl⁻ mg/l	Nitrates as N mg/l	pH	Spec. Cond. μmhos./1cm	Hardness as CaCO$_3$, mg/l	Color	Turbidity	Susp. Sol. mg/l	Vol. Susp. Sol. mg/l	B.O.D. mg/l	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/l	Diss. Oxygen % Sat.	pH
1960																
Max.	212	79	10.6	9.0	946	320	50	80	56	34	18.0	23,000,000	28	9.3	88	8.6
Min.	114	28	1.4	7.2	655	240	10	5	4	2	2.1	2,300	5	0.0	0	7.2
Ave.	151	54	6.2	7.7	804	[illegible]	20	25	18	9	6.1	930,000	19	4.8	50	7.8
Med.											4.1	750,000				
1961																
Max.	228	77	7.3	8.3	1067	420	100	100	56	34	53.0	24,000,000	32	12.5	116	8.2
Min.	130	32	0.0	6.9	516	142	10	5	10	5	3.0	93,000	1	0.0	0	7.0
Ave.	173	53	2.0	7.5	812	275	50	40	31	17	16.8	2,500,000	17	3.4	35	7.1
Med.											14.0	750,000				
1962																
Max.	304	175	5.6	8.1	1225	396	50	500	108	102	38.0	24,000,000	30	9.5	82	8.0
Min.	112	40	0.0	6.8	541	148	10	10	12	7	2.4	20,000	5	1.8	20	7.2
Ave.	197	74	1.0	7.5	998	300	25	60	36	23	23.2	3,900,000	17	4.8	46	7.7
Med.											17.0	1,600,000				
1963																
Max.	238	96	6.5	7.8	1145	407	100	150	68	52	160.0	65,000,000	30	11.7	153	8.2
Min.	92	15	0.0	6.9	356	180	5	10	5	5	4.0	30,000	6	0.0	0	7.6
Ave.	191	66	1.6	7.4	889	306	30	60	39	23	41.0	9,900,000	20	3.0	36	8.0
Med.											26.0	1,900,000				
1964																
Max.	234	122	6.6	7.9	1216	368	40	300	52	33	55.0	12,000,000	29	11.5	125	7.5
Min.	122	28	0.0	7.0	526	170	5	10	9	7	6.1	10,000	6	0.0	0	6.7
Ave.	196	72	1.2	7.5	942	300	20	45	23	15	17.2	2,300,000	18	4.8	47	7.1
Med.									*213	*126	14.0	1,100,000				

* These figures are not included in average

WATER QUALITY - CALUMET AREA
INDIANA HARBOR CANAL - COLUMBUS DRIVE

	Laboratory Analyses													Field Tests			
Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl- mg/1	Nitrates as N mg/1	pH	Spec. Cond. µmhos./1cm	Hardness as CaCO$_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/1	Diss. Oxygen % Sat.	pH
1960																
Max.	132	34	1.6	7.9	415	232	50	40	24	16	9.3	4,300,000	32	1.3	14	8.0
Min.	80	14	0.3	7.0	316	151	10	10	8	3	0.7	9,300	11	0.0	0	7.0
Ave.	110	19	0.9	7.5	393	171	25	20	16	8	5.9	600,000	23	0.3	4	7.7
Med.											4.7	93,000				
1961																
Max.	128	27	4.8	8.0	471	204	30	100	118	23	18.0	4,300,000	34	7.0	63	8.4
Min.	92	11	0.3	6.9	365	148	0	10	5	2	1.3	23,000	9	0.0	0	7.0
Ave.	116	18	1.0	7.4	437	176	20	25	25	9	7.9	160,000	19	2.5	25	7.5
Med.											8.3	230,000				
1962																
Max.	148	85	2.1	8.0	904	230	25	75	57	29	18.0	440,000	35	6.0	48	8.0
Min.	74	9	0.4	6.5	352	126	5	5	12	3	0.6	1,000	6	0.0	0	6.6
Ave.	117	21	0.9	7.5	440	176	10	25	29	12	8.5	152,000	20	2.2	22	7.5
Med.								*215			8.7	82,000				
1963																
Max.	198	65	2.8	7.9	754	237	30	40	55	24	22.0	2,500,000	31	3.9	40	8.4
Min.	102	14	0.0	7.0	363	151	5	5	0	0	2.0	4,500	9	0.0	0	7.0
Ave.	129	21	0.8	7.5	448	180	15	15	21	9	8.5	390,000	22	1.6	16	8.0
Med.					*4066						7.4	150,000				
1964																
Max.	138	27	2.7	7.9	514	206	30	100	75	23	76.0	7,000,000	33	6.8	70	7.5
Min.	92	16	0.0	6.9	400	158	5	10	12	6	1.5	84,000	11	0.0	0	6.5
Ave.	119	20	0.7	7.3	443	176	10	40	34	12	10.0	950,000	21	2.8	28	7.1
Med.											7.6	380,000				

* These figures are not included in average.

Appendix 20

WATER QUALITY - CALUMET AREA
INDIANA HARBOR CANAL - INDIANAPOLIS BOULEVARD

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/l	Chlorides as Cl⁻ mg/l	Nitrates as N mg/l	pH	Spec. Cond. µmhos./1cm	Hardness as CaCO$_3$, mg/l	Color	Turbidity	Susp. Sol. mg/l	Vol. Susp. Sol. mg/l	B.O.D. mg/l	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/l	Diss. Oxygen % Sat.	pH
1960																
Max.	147	72	0.9	8.5	706	200	80	80	67	28	29.0	2,300,000	33	0.5	7	8.6
Min.	112	20	0.0	7.5	446	159	15	15	17	0	6.6	23,000	11	0.0	0	7.0
Ave.	132	43	0.2	7.8	589	179	35	35	25	11	13.6	450,000	23	0.1	2	7.8
Med.											10.0	230,000				
1961																
Max.	194	67	2.5	8.5	770	300	80	75	62	21	22.0	2,900,000	32	0.4	5	8.4
Min.	118	16	0.0	7.1	385	162	10	5	8	3	4.3	3,900	10	0.0	0	7.2
Ave.	143	41	0.6	7.7	610	196	30	30	15	11	13.9	440,000	19	0.1	1	7.7
Med.											14.0	230,000				
1962																
Max.	172	61	2.3	8.8	706	340	50	100	45	34	42.0	1,000,000	37	7.0	55	8.4
Min.	110	25	0.0	6.8	441	156	5	10	8	1	3.8	5,000	5	0.0	0	7.0
Ave.	134	39	0.5	7.7	597	223	20	30	23	16	17.0	188,000	20	1.2	11	7.5
Med.					*1255						14.0	170,000				
											*131.0					
1963																
Max.	184	70	1.2	8.8	875	274	35	70	56	23	28.0	29,000,000	31	1.0	10	8.3
Min.	104	17	0.0	7.0	470	162	10	5	1	1	5.7	6,000	10	0.0	0	6.8
Ave.	139	39	0.4	7.5	575	191	20	25	21	10	11.2	6,600,000	22	0.1	1	7.9
Med.									*153	*134	10.0	730,000				
											*110.0					
1964																
Max.	166	77	0.5	8.2	779	260	40	130	58	22	24.0	6,000,000	33	0.0	0	7.6
Min.	106	28	0.0	7.0	498	146	10	15	12	5	3.3	50,000	11	0.0	0	6.7
Ave.	139	52	0.2	7.5	645	191	20	10	24	11	13.2	1,200,000	22	0.0	0	7.2
Med.											12.0	530,000				

* These figures are not included in average.

WATER QUALITY - CALUMET AREA
INDIANA HARBOR CANAL - DICKEY ROAD

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl^- mg/1	Nitrates as N mg/1	pH	Spec. Cond. μmhos./1cm	Hardness as $CaCO_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/1	Diss. Oxygen % Sat.	pH
1960																
Max.	132	39	1.8	7.9	479	230	60	60	29	17	12.0	930,000	32	1.0	11	8.0
Min.	102	18	0.1	7.3	340	160	10	10	13	5	4.8	23,000	10	0.0	0.	7.2
Ave.	116	23	0.6	7.7	432	182	25	25	19	9	6.0	360,000	23	2.0	2	7.6
Med.											5.7	230,000				
1961																
Max.	220	31	1.6	8.1	642	202	30	100	58	24	14.0	9,300,000	32	5.0	38	8.0
Min.	96	18	0.0	6.8	403	160	5	10	6	1	4.3	300	9	0.0	0	6.8
Ave.	125	22	0.5	7.3	449	173	15	25	21	11	7.5	130,000	18	0.6	6	7.4
Med.											6.8	430,000				
1962																
Max.	134	35	10.0	8.0	582	202	35	100	134	106	90.0	1,900,000	36	3.6	27	8.0
Min.	66	17	0.0	7.1	394	149	5	10	11	5	1.7	1,000	7	0.0	0	7.0
Ave.	111	22	1.1	7.5	452	180	15	30	29	18	15.5	330,000	20	0.8	8	7.6
Med.											7.0	130,000				
1963																
Max.	224	43	1.3	8.0	625	298	20	50	36	13	20.0	5,900,000	30	2.1	19	8.5
Min.	105	12	0.0	7.0	392	144	5	5	0	0	0.0	6,000	4	0.0	0.	7.0
Ave.	128	22	0.3	7.4	418	181	15	15	17	7	11.8	840,000	19	0.2	2	7.9
Med.											5.7	170,000				
1964																
Max.	136	30	0.8	8.1	699	210	50	115	51	28	22.0	3,800,000	33	4.8	44	8.1
Min.	106	15	0.0	6.8	426	160	5	15	11	5	1.9	170,000	10	0.0	0.	6.7
Ave.	123	23	0.3	7.3	481	181	15	40	24	10	7.2	740,000	20	0.7	1	7.2
Med.											6.0	1,100,000				

WATER QUALITY - CALUMET AREA
INDIANA HARBOR CANAL - DICKEY ROAD (Continued)

Date	Tot. Phos.	Tot. Odors	Detergents	Tot. Chrome	Sulphate	Oil	Iron	Flurrides	Phenols	N H_3	CN	Arsenic	Zinc	Lead	Manganese	Sodium	Potassium	Copper	Nickel	Cadmium	Tot. Solids	Tot. Vol. Sol.
1960																						
Max.	1.0	22	0.3	0.1	110	19	4.8	0.6	0.14	7.5	0.5	.05	7.2	<0.1	0.2	20	5	5.6	0.1	0.1	311	156
Min.	0.5	400	0.0	0.0	50	0	1.6	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	16	3	0.8	0.1	0.1	274	86
Ave.	0.7	118	0.2	0.02	70	10	3.0	0.3	0.032	4.3 *500	0.06	0.01	1.5	<0.1	0.1	18	4	2.6	0.1	0.1	291	107
1961																						
Max.	7.5	900	3.8	0.6	132	75	13	0.6	0.3	12.0	0.8	0.1	6.5	0.6	1.1	35	5					
Min.	0.4	11	0.0	0.0	31	1.6	1.0	0.1	0.002	1.2	0.0	0.0	0.2	0.06	0.05	12	3					
Ave.	2.6 *33.0	204	0.5	0.09	81	24	3.9	0.4	0.12	5.0	0.1	0.05	1.2	0.1	0.3	20	4					
1962																						
Max.	9.5	400	2.8	0.8	128	76	8.5	0.5	0.3	12.0	1.7	0.1	1.4	0.1	0.8	60	5	1.6	0.7	0.1	378	161
Min.	0.7	16	0.0	0.0	15	0	1.4	0.2	0.01	3.0	0.0	0.0	0.2	0.0	0.0	12	3	0.0	0.0	0.0	165	40
Ave.	5.6	151	0.5	0.19	74	20	3.3	0.4	0.06	7.1	0.18	0.04	0.6	0.08	0.3	20	4	0.4	0.07	0.04	306	99
1963																						
Max.	1.2	400	1.2	0.7		10.0	3.4	0.6	0.2	20.0	1.3	0.1	3.0	0.6	0.3	25	23					
Min.	0.2	64	0.0	0.02		0.0	0.0	0.2	0.0	1.0	0.0	0.0	0.1	0.0	0.1	3	3					
Ave.	0.6	140	0.5	0.17		2.1	2.0	0.4	0.06	6.3	0.2	0.02	0.66	0.11	0.2	18	4					
1964																						
Max.	3.1	220	1.5	0.86		16.0	6.0	0.7	0.5	56	0.6	0.03	1.3	0.3	3.0	25	30	0.7	0.5	1.0	355	186
Min.	0.1	8	0.2	0.0		0.0	0.2	0.2	0.006	1	0.0	0.0	0.28	0.03	0.1	10	2	0.0	0.0	0.0	179	69
Ave.	0.5	48	0.5	0.10		4.7	2.4	0.4	0.057	9	0.2	0.007	0.7	0.07	0.4	21	5	0.3	0.03	0.05	300	93

*These figures are not included in average.

WATER QUALITY - CALUMET AREA
BURNS DITCH - OGDEN DUNES

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/l	Chlorides as Cl⁻ mg/l	Nitrates as N mg/l	pH	Spec. Cond. µmhos./1cm	Hardness as CaCO$_3$, mg/l	Color	Turbidity	Susp. Sol. mg/l	Vol. Susp. Sol. mg/l	B.O.D. mg/l	Coliform per 100 ml.	Temp. -C°	Diss. Oxygen mg/l	Diss. Oxygen % Sat.	pH
1960																
Max.	274	46	1.3	8.6	739	360	35	60	57	19	7.7	93,000	24	14.2	153	8.8
Min.	206	15	0.7	7.8	540	326	10	15	12	5	2.6	9,300	0	8.5	78	7.8
Ave.	252	23	1.1	8.2	664	330	20	30	30	12	4.8	39,000	13	11.4	109	8.3
Med.											4.8	23,000				
1961																
Max.	278	30	3.7	8.4	796	386	50	220	228	58	31.0	430,000	26	16.0	175	8.4
Min.	118	8	0.5	7.4	342	194	10	5	7	3	1.3	9,300	1	5.2	53	7.6
Ave.	200	21	1.6	7.9	624	331	25	60	82	14	5.6	110,000	13	9.7	92	8.0
Med.											3.8	43,000				
1962																
Max.	266	36	3.3	8.5	753	346	25	75	90	36	20.0	1,380,000	24	12.5	147	8.4
Min.	112	9	0.1	7.5	376	184	10	5	10	1	0.5	900	1	4.5	44	8.2
Ave.	221	23	1.2	8.1	638	310	20	35	41	21	5.9	180,000	13	9.3	90	8.2
Med.											4.3	69,000				
1963																
Max.	290	37	3.8	8.4	921	410	30	70	58	21	14.0	1,400,000	26	13.3	131	8.5
Min.	140	6	0.1	7.3	303	146	5	5	2	0	1.3	1,300	2	6.0	43	7.8
Ave.	206	23	1.0	8.0	696	307	15	20	22	8	4.8	190,000	12	8.7	80	8.2
Med.	*1140										4.1	69,000				
1964																
Max.	260	38	3.0	8.3	799	390	30	80	47	15	11.0	600,000	28	14.0	126	8.0
Min.	144	5	0.	7.6	409	198	5	5	4	2	1.8	1,000	1	1.6	19	7.1
Ave.	196	29	0.9	7.9	713	327	15	30	20	8	4.2	58,000	14	8.8	84	7.5
Med.											4.0	17,000				

* These figures are not included in average.

Appendix 23

WATER QUALITY - CALUMET AREA
WOLF LAKE CHANNEL - INDIANAPOLIS BOULEVARD (LEVER BROTHERS COMPANY)

Date	B.O.D. mg/1	pH	Alk. (total) as CaCO, mg/1	Chlorides as Cl^- mg/1	Tot. Sol. mg/1	Vol. Tot. Sol. mg/1	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	C.O.D. mg/1	Oil
1963										
Max.	77.0	8.6	160	36	256	128	58	28	156	10.0
Min.	18.0	7.1	96	8	184	75	3	1	26	0.0
Ave.	54.0	7.9	106	14	208	96	15	7	58	4.0
1964										
Max.	77.0	8.2	132	40	324	111	37	14	130	26.0
Min.	1.7	7.1	98	5	187	76	5	2	35	0.0
Ave.	28.3	7.7	107	15	215	94	15	7	76	6.3

Appendix 24

WATER QUALITY - CALUMET AREA
BURNS DITCH - CHRISMAN ROAD

Date	Laboratory Analyses												Field Tests			
	Alk. (total) as CaCO, mg/1	Chlorides as Cl⁻ mg/1	Nitrates as N mg/1	pH	Spec. Cond. µmhos./1cm	Hardness as CaCO$_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/1	Diss. Oxygen % Sat.	pH
1964																
Max.	272	34	3.8	8.2	748	368	35	100	74	26	7.6	2,000,000	26	13.5	116	8.0
Min.	154	16	0.5	7.3	606	156	10	5	6	2	1.0	1,300	0	6.0	62	7.1
Ave.	236	25	1.3	7.8	687	329	15	30	28	8	2.7	120,000	14	9.0	95	7.5
Med.											2.2	8,000				

WATER QUALITY - CALUMET AREA
BURNS DITCH - RAILROAD TRESTLE

	Laboratory Analyses												Field Tests			
Date	Alk. (total) as CaCO, mg/1	Chlorides as Cl- mg/1	Nitrates as N mg/1	pH	Spec. Cond. umhos./1cm	Hardness as $CaCO_3$, mg/1	Color	Turbidity	Susp. Sol. mg/1	Vol. Susp. Sol. mg/1	B.O.D. mg/1	Coliform per 100 ml.	Temp.-C°	Diss. Oxygen mg/1	Diss. Oxygen % Sat.	pH
1964																
Max.	268	48	3.5	8.3	784	376	25	90	73	18	6.1	210,000	28	14.0	134	8.0
Min.	182	23	0.0	7.5	642	306	10	10	6	1	1.4	2,000	0	7.0	67	7.1
Ave.	226	35	1.1	7.8	726	345	20	40	33	10	3.7	38,000	13	9.0	89	7.5

Appendix 25

Appendix 26

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Wolf Lake

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Lever Brothers Co. Hammond	Hammond Sanitary District	Interconnection to Hammond Sanitary District.	Before 1944		Wolf Lake
		Effluent chlorination.	1944		
		Air flotation units.	1951	Total 750	
		In-plant control.	1962		

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River (West)

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Adolph Plating, Inc. East Chicago	East Chicago Sanitary District	Cyanide isolation facilities.	Under Construction		Grand Calumet River
LaSalle Steel Co. Hammond	Hammond Sanitary District	Acid neutralization.	Before 1950	16	Little Calumet River

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Little Calumet (West)

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Simmons Company Munster	Hammond Sanitary District	Cyanide isolation facilities. Alkaline-chlorination of cyanides and chromium treatment facilities.	1961	65	Little Calumet River

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Little Calumet River-Burns Ditch

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Bethlehem Steel Co. Burns Harbor Plant Chesterton	Activated sludge with effluent chlorination plus terminal lagoon	Scale pits, chemical flocculation-clarification units, oil separator, acid neutralization, terminal lagoon, deep well disposal system and cyanide isolation facilities.	Under Construction	7,000	Little Calumet River
Midwest Steel Div. National Steel Corp. Portage	Activated sludge with effluent chlorination	Chemical treatment plant and oily waste treatment plant with a sludge lagoon. Deep well disposal system, and cyanide isolation facilities.	1961	Total 6,025	Burns Ditch

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River-Indiana Harbor Canal-Lake Michigan

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
American Steel Foundries Co. East Chicago	East Chicago Sanitary District	Settling basin	1910 1943	15	Indiana Harbor Canal
Blaw Knox Co. East Chicago	East Chicago Sanitary District	Settling tanks and filters			Indiana Harbor Canal
Cities Service Oil Company East Chicago	East Chicago Sanitary District	Oil separation tanks.	Before 1943		Grand Calumet River
		Additional oil separators.	1949	1,203	
		Sulfide and ammonia stripper, caustic and sulfuric acid is sold, improved cooling water oil separators, and surfpac and activated sludge pilot plants.	Before 1965	542	
E. I. duPont Co. East Chicago	East Chicago Sanitary District	Controlled discharge facilities.	1947	60	Grand Calumet River
		Additions to controlled discharge facilities and acid neutralization.	1957	65	
General American Transportation Corp. Plant #2 East Chicago	East Chicago Sanitary District	Pond, settling basin, oil separator, pH control, chemical treatment and clarification plant.	Before 1949	200	Indiana Harbor Canal
Northern Indiana Public Service Co. Baileytown	Septic-absorption system	Ash disposal with soil absorption of sluicing water.	1961	70	Lake Michigan

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River-Indiana Harbor Canal-Lake Michigan

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Inland Steel Co. East Chicago	1948-Trickling filters with effluent chlorination 1957-2nd Trickling filters with effluent chlorination 1964-Trickling filter additions 1965-3rd Trickling filter with effluent chlorination	Sewers, scale pits, coke plant cooling water recirculation, phenol recovery system. Blast furnace slag & refuse disposal facilities. Flue dust thickeners sludge equipment. Additional flue dust thickeners and sewers. Phenol extraction and naphthalene recovery. Eastward expansion plant lagoon. Blooming mill sewers & scale pit. Additional facilities and sewers. 80" Hot Strip Mill-scale pits, chemical clarification and outfall tunnel. Proposed sewer work	Before 1949 1949-1955 1956-1963 1964 Future	6,216 1,050 1,284 1,050 9,500 1,000	Indiana Harbor Canal and Lake Michigan
Linde Air Prods. Company East Chicago	East Chicago Sanitary District	All industrial waste to East Chicago Sanitary District except cooling tower blowdown			Indiana Harbor Canal
Mobil Oil Co. East Chicago	East Chicago Sanitary District	Oil separators, routine monitoring program cooling towers, straw filters and ballast oil separator. Sulfide and ammonia stripper	1949 or before 1964	600	Indiana Harbor Canal

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River-Indiana Harbor Canal-Lake Michigan

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Sinclair Refining Co. East Chicago	East Chicago Sanitary District	Sewers, cooling towers, API oil separator, ammonia-sulfide stripper and spent caustic treatment system.	Before 1950	2,101	Indiana Harbor Canal
		Additional cooling towers, new spent caustic treating unit, new ammonia-sulfide stripper, ballast water and ground drainage oil separators.	1950-1964	1,830	
U. S. Gypsum Co. East Chicago	East Chicago Sanitary District	None	1955		Indiana Harbor Canal
U.S.S. Lead Refinery Inc. East Chicago	East Chicago Sanitary District	No industrial waste discharge to a watercourse	1947	27	Grand Calumet River (cooling water)
Youngstown Sheet & Tube Company East Chicago	East Chicago Sanitary District Some septic-absorption systems	Sewer separation, dephenolizer.	Before 1945	500	Indiana Harbor Canal and Lake Michigan
		Sewer separation.	After 1945	150	
		Waste pickle liquor recovery.	1950	76	
		#2 Blooming Mill scale pit.	1952	250	
		#1 Tin Mill outfall sewer & scale pit, 56" pickle line waste disposal & oil recovery, Dorr thickener-flue dust recovery	1953	277	
		Secondary scale pit.	1954	710	
		#2 Tin Mill acid & chemical control, Seamless Tube Mill scale pits, Dorr thickener improvements.	1955	555	
		New dephenolizer	1956	400	

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River-Indiana Harbor Canal-Lake Michigan

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Youngstown Sheet & Tube Company East Chicago (continued)		Hot Strip Mill-primary scale pit.	1957	882	
		Tin Mill 6-stand oily waste treatment and cyanide isolation facilities	1959	133	
		#2 Tin Mill-sewer sampler	1960	9	
		Merchant Mill-waste pickle liquor recovery	1962	18	
		Sheet Mill scale pit	1963	20	
		Scale pits oil recovery facilities, Venturi scrubber-Blast Furnace	1964	214	
		New 80" Sheet Mill-oil & acid recovery, oil separator & terminal lagoon.	1965	379	
American Bridge Div. U.S.Steel Corp. Gary	Gary Sanitary District	Sewers		Total 1,000	Grand Calumet River
Perry Refining Co. Gary	Septic-absorption system	Oil separator and impounding basin	1958	15	No discharge to watercourse
Gary Sheet & Tin Mill Div., U.S. Steel Corporation Gary	Gary Sanitary District	Waste pickle liquor absorption lagoon, sewers.	Before 1945		Grand Calumet River and Lake Michigan (cooling water)
		Continuous Hot Strip Mill scale pits.	1949		
		80" 5-stand sheet mill oily waste system	1963	Total 3,600	
		Deep well disposal system and stainless steel neutralization-disposal lagoon.	1965		

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River-Indiana Harbor Canal-Lake Michigan

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Gary Steel Works U.S. Steel Corp. Gary	Gary Sanitary District	Scale pits, flue dust-partial recovery, coke plant wastewaters quenched, waste pickle liquor disposed of on slag fill and sewers.	1950		Grand Calumet River Lake Michigan (cooling waters)
		160"/210" Plate Mill scale and oil recovery pits	1962	Total 11,000	
National Tube Div. U.S. Steel Corp. Gary	Gary Sanitary District	Sewers	1949	Total 800	Grand Calumet River
Northern Ind. Public Service Company Gary	Septic system (Effluent to Lake Michigan via cooling water discharge)	Settling ponds for fly ash and bottom ash.	1957	82	Lake Michigan
Steiner Tissue Mill Gary	Gary Sanitary District	Two save-alls			Grand Calumet River
Universal Atlas Cement Company U.S. Steel Corp. Gary	Trickling Filter	No industrial waste discharge to a watercourse.	1926	Total 200	Lake Michigan
Vulcan Detinning Co. Gary	Septic-absorption system	Settling ponds (Wastes will be eliminated by March, 1965)	1953	12	Grand Calumet River

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES
Grand Calumet River-Indiana Harbor Canal-Lake Michigan

Industry & Location	Sanitary Sewage Treatment	Industrial Waste Treatment	Year Completed	Cost in $1,000	Receiving Waters
Amer. Maize Prod. Co. Hammond	Hammond Sanitary District New (1962) warehouse sewered to industrial waste lagoon	Process revisions.	Before 1950	850	Lake Michigan
		Routine monitoring program and sewer interconnection to Hammond sewerage system.	1952-1956	225	
		Anaerobic-aerobic lagoon system and surfpac pilot plant.	1959	40	
Calumet Nitrogen Prods. Company Hammond	Hammond Sanitary District	Holding pond.	1956	50	Indiana Harbor Canal
		Connected ammonium nitrate plant to Hammond Sanitary District.	1964		
Commonwealth Edison Co., Inc. Hammond	Chicago Sanitary District	Sewers	1920		Lake Michigan
		Fly ash and slag de-watering bins	1961	Total 460	
American Oil Co. Whiting	Whiting Sewerage System	Oil separators.	1940		Lake Michigan
		Additional oil separators.	1949	6,055	
		Bio-flotation process facilities.	1960	3,000	
Union Carbide Chems. Company Whiting	Whiting & East Chicago Sewerage Systems	Closed system.	1947		Lake Michigan and Indiana Harbor Canal
		Internal improvements.			
		Water recirculation system.	1960		
		Water recirculation system improvements and skimming basins.	1963	Total 950	
		Additions to existing facilities.	1965	46	
Union Tank Car Co. Whiting	Septic-absorption system	Three chemical oil separation basins.	Before 1960	15	Indiana Harbor Canal

Appendix 27

Resume of Orders Issued to Calumet Area Municipalities

1. The Department of Commerce and Industry under the authority of Chapter 152, Acts of 1935, issued orders to East Chicago, Gary, Hammond and Whiting. A sample copy of said order reads as follows:

FINAL NOTICE AND ORDER TO ABATE CONDITION OF POLLUTION AND TO CEASE VIOLATION OF SECTION 5, CHAPTER 152, ACTS OF THE GENERAL ASSEMBLY OF THE STATE OF INDIANA, 1935.

TO: THE CITY OF EAST CHICAGO
COUNTY OF LAKE
STATE OF INDIANA

WHEREAS, it has heretofore been determined by the Department of Commerce and Industries of the State of Indiana, that you are violating the provisions of Section 5, Chapter 152, Acts of the General Assembly of Indiana, 1935, in that you are throwing, running, draining and otherwise disposing into the waters of the Grand Calumet River, the Indiana Harbor Ship Canal and Lake Michigan, and are causing, permitting and suffering to be thrown, run, drained and otherwise disposed into such waters, certain organic and inorganic matter, to-wit: domestic sewage and industrial wastes, which are contributing to a polluted condition of such waters, according to a determination of the qualities and properties of water indicating a polluted condition thereof, which is deleterious to the public health, injuriously affects the use of such waters for domestic animals and injuriously affects aquatic life and the growth and propagation thereof as fixed and determined by the Department of Commerce and Industries of the State of Indiana, and filed of record in the office of said Department at the City of Indianapolis, County of Marion, Indiana; and

WHEREAS, pursuant to such determination you were heretofore, to-wit: on the 11th day of September, 1937, ordered and directed to cease such violation and abate and correct such condition of pollution on or before the first day of January, 1939; and

WHEREAS, notice of such determination and order was duly served and published as provided by law, and more than fifteen days have elapsed since the receipt and publication of such notice; and

WHEREAS, a written report has been filed in behalf of the City of East Chicago, by its proper executive and administrative officials, showing what steps for correction or abatement are being instituted, and no evidence denying the fact of such violation and no written petition has been filed in behalf of such city or by forty or more taxpayers or owners of real estate in such city, denying the fact of such violation and requesting a hearing thereon;

NOW, THEREFORE, the determination and order heretofore made in the premises is hereby affirmed and made final, and it is the final order of this Department that the said City of East Chicago cease such violation and abate and correct such condition of pollution on or before the first day of January, 1939, all as heretofore ordered.

THIS NOTICE AND ORDER executed and issued at Indianapolis, Indiana, this 14th day of October, 1937.

DEPARTMENT OF COMMERCE AND INDUSTRIES
STATE OF INDIANA

By: W. H. Frazier, Assistant Director
Indiana State Board of Health

2. The Stream Pollution Control Board, under the authority of Chapter 214, Acts of 1943, as amended, issued orders to Highland and Munster on December 14, 1945. A sample copy of said order reads as follows:

FINAL ORDER

WHEREAS, it has heretofore been originally determined by the Stream Pollution Control Board of the State of Indiana, that the Town of Highland, Lake County, Indiana, is contributing to the polluted condition existing in the waters of the Little Calumet River by throwing, running, draining and otherwise disposing into said waters, and by causing, permitting and suffering to be thrown, run, drained, and otherwise disposed into said waters certain organic and inorganic matter, to wit: domestic sewage and industrial wastes, in violation of the provisions of Sections 7 and 8, Chapter 214, Acts of The General Assembly of Indiana of 1943, as amended by Chapter 132, Acts of The General Assembly of Indiana, 1945; and

WHEREAS, pursuant to such original determination, the Town of Highland, Lake County, Indiana, was on the 25th day of August, 1944, duly ordered and directed to cease such violation and to abate and correct such condition of pollution on or before the 1st day of July, 1945; and

WHEREAS, notice of such original determination and order was duly served and published as provided by law, and more than fifteen days have elapsed since the receipt and publication of such notice; and

WHEREAS, the Town of Highland advised the Stream Pollution Control Board of the State of Indiana on the 6th day of December, 1945, that said Town had prepared tentative plans for sewage treatment; that said plans were being studied and that other possibilities such as connecting to the Hammond sewerage system were being investigated;

NOW, THEREFORE, BE IT RESOLVED, That The Stream Pollution Control Board of the State of Indiana does hereby affirm said original determination and order, does hereby make said original determination and order final, and does hereby finally order said Town of Highland to cease such violation and abate and correct such condition of pollution on or before the 1st day of January, 1947.

This notice and order executed and issued at Indianapolis, Indiana, this 14th day of December, 1945.

STREAM POLLUTION CONTROL BOARD
STATE OF INDIANA

B. A. Poole
Technical Secretary

R. B. Wiley
Chairman

3. The Stream Pollution Control Board, under the authority of Chapter 214, Acts of 1943, as amended, and in accordance with the Chapter 365, Acts of 1947, issued orders to Crown Point, Hobart and Valparaiso in 1948 and 1949. A sample copy of said order reads as follows:

STREAM POLLUTION CONTROL BOARD

OF THE STATE OF INDIANA

IN THE MATTER OF:)
)
THE CITY OF HOBART,)
INDIANA)

FINAL ORDER AND DETERMINATION

Ralph B. Wiley, Chairman of the above board and designated as hearing member in the above cause, having presented to and filed with said board on September 14, 1948, his Recommended Findings of Fact and Order, in the above cause, together with the complete record of proceedings before him, other than the transcript of the oral testimony, and notice of such filing, together with a copy of said Recommended Findings of Fact and Order, having been transmitted to The City of Hobart, Indiana, by registered mail on September 14, 1948, return receipt requested, and said City of Hobart having filed no objections thereto, said Board having considered said Recommended Findings of Fact and Order now on this 29th day of September, 1948, adopts the same without amendment or modification and now makes the following as its Findings of Fact:

1. That the City of Hobart discharges untreated domestic sewage and industrial waste through its municipal sewers into the waters of Deep River.

2. That said untreated domestic sewage and industrial waste are of such character as to prevent the growth of and propagation of normal fish and plant life downstream in said waters from the points of entry of said domestic sewage and industrial waste into said water course.

3. That such untreated domestic sewage and industrial waste are of such character as to render said waters unfit for use by live stock.

4. That the presence of said untreated domestic sewage and industrial waste in said waters is a hazard to the public health.

5. That under the provisions of Sections 7 and 8, Chapter 214 of the Acts of 1943, known as the Stream Pollution Control Law, the City of Hobart, Indiana, is polluting the waters of Deep River downstream from the point of entry into said stream of said untreated domestic sewage and industrial waste.

IT IS NOW FINALLY ORDERED AND DETERMINED, that said defendant, The City of Hobart, cease and desist from causing pollution of Deep River downstream from the point of entry into said stream of said untreated domestic sewage and industrial waste, on or before July 1, 1950.

September 29, 1948

ATTEST:

Technical Secretary
Stream Pollution Control Board
of the State of Indiana

4. The Stream Pollution Control Board, under the authority of Chapter 214, Acts of 1943, as amended, and in accordance with the Chapter 365, Acts of 1947, issued orders to Dyer (1960), Griffith (1959), Hammond (Munster) (1961), Porter (1964) and Schererville (1962). It is noted that in addition to the usual order, compliance dates for submission of plans and start of construction are included. A sample copy of said order reads as follows:

STREAM POLLUTION CONTROL BOARD
OF THE STATE OF INDIANA

IN THE MATTER OF:)
)
THE TOWN OF PORTER,)
INDIANA)

FINAL ORDER AND DETERMINATION

Donald E. Foltz, Member of the above Board and designated as hearing officer in the above cause, having presented to and filed with the Stream Pollution Control Board of Indiana on September 16, 1964, his Recommended Findings of Fact and Recommended Order Regarding Hearing of August 7, 1964, of the Town of Porter, Indiana, together with the complete record of proceedings before him, other than the transcript of the oral testimony, and notice of such filing, together with a copy of said Recommended Findings of Fact and Recommended Order Regarding Hearing of August 7, 1964, of the Town of Porter, Indiana, having been transmitted to the Town of Porter, Indiana, by registered mail on September 17, 1964, return receipt requested, and there being no objections by anyone, said Board now considers said Recommended Findings of Fact and Recommended Order Regarding Hearing of August 7, 1964, of the Town of Porter, Indiana, on this 8th day of October, 1964, and by a majority of a quorum present and voting hereby adopts the same without amendment or modification and now makes the following as its Findings of Fact:

1. That the Town of Porter discharges raw and inadequately treated sanitary and domestic sewage into the waters of the Little Calumet River in or near the corporate limits of said Town of Porter.

2. That the discharge by the Town of Porter of raw and inadequately treated sanitary and domestic sewage into the Little Calumet River, contributes to the formation of putrescent and objectionable sludge banks in said waters and along the banks thereof downstream from the points of entry of said sewage.

3. That the discharge by the Town of Porter of raw and inadequately treated sanitary and domestic sewage into the Little Calumet River, contributes to the growth of sewage fungi (Sphaerotilus spp.) and other pollution-tolerant organisms.

4. That said raw and inadequately treated sanitary and domestic sewage discharged by the Town of Porter, is of such character as to injuriously affect the normal growth and propagation of fish and other beneficial aquatic life in the Little Calumet River downstream from the points of entry of said sewage.

5. That the Town of Porter discharges raw and inadequately treated sanitary and domestic sewage into the Little Calumet River, thereby causing and contributing to a coliform bacteria concentration as high as 2,600 000 MPN (Most Probable Number) per 100 milliliters in said water downstream from the points of entry of said sewage.

6. That the presence of said raw and inadequately treated sanitary and domestic sewage in said waters is a hazard to the public health.

7. That the Town of Porter has no municipal sewage treatment facility.

8. That the recent growth in population of the Town of Porter is indicative of future growth attended by increased quantities of sewage in municipal sewers and increased degree of pollution in the receiving waters.

9. That said raw and inadequately treated sanitary and domestic sewage discharged to the Little Calumet River by the Town of Porter is of such character as to adversely affect the waters for recreational uses downstream from the points of entry of said sewage.

10. That the Town of Porter has violated, is now violating, and is about to violate provisions of Chapter 214, Acts of 1943, and Regulation SPC 1 of the Stream Pollution Control Board, by permitting, causing or contributing to a polluted condition of the Little Calumet River in a manner that is unreasonable and against public interests by discharging through its municipal sewers raw and inadequately treated sanitary and domestic sewage into said waters.

11. That facilities must be constructed for the adequate treatment of all the sanitary and domestic sewage and industrial and other wastes discharged into the Town sewer system, and with such additional capacity as to allow for the anticipated future growth of the Town of Porter for a reasonable period of time.

IT IS NOW FINALLY ORDERED AND DETERMINED that said defendant, the Town of Porter, Indiana, cease and desist from causing and contributing to the pollution of the Little Calumet River downstream from the points of entry of said raw and inadequately treated sanitary and domestic sewage into said waters; and that said defendant, the Town of Porter, shall:

(1) Submit final construction plans and specifications for adequate treatment of said sewage to the Stream Pollution Control Board for review by March 1, 1965;

(2) Start construction of approved facilities by July 1, 1965; and

(3) Complete the construction of said facilities on or before July 1, 1966,

which said facilities shall treat adequately all sanitary and domestic sewage, including industrial wastes, of said Town including that coming into or contemplated as coming into the sewer system of said Town.

October 6, 1964

ATTEST:

Technical Secretary
Stream Pollution Control Board
of the State of Indiana

Status of Municipal Sewage Works

Little Calumet River- West

Municipality	Pop. 1960	Design Pop.	Design Flow, mgd.	Type Treatment	Completion Dates	Project Costs	Receiving Stream	Remarks
Dyer	3,993	6,000	0.6	Act. Sludge + Cl_2	1966	$970,000 + (1)	Hart Ditch - L. Calumet R.	Under construction
Griffith	9,483	-	-	-	1964	1,766,000	Cady Marsh D.- L. Calumet R.	Connected to Hammond Sanitary District
Highland	16,284	-	-	-	1966	1,109,500 + (1)	Cady Marsh D.- L. Calumet R.	1/2 presently connected and rest under const. to Hammond Sanitary District
Munster	10,313	-	-	-	1964	(Included in Hammond costs)	Hart Ditch & L. Calumet R.	Connected to Hammond Sanitary District
Schererville	2,875	6,000	0.86	Act. Sludge + Cl_2	1965	1,264,720 + (1)	Hart Ditch - L. Calumet R.	Under construction

Little Calumet River - Burns Ditch

Municipality	Pop. 1960	Design Pop.	Design Flow, mgd.	Type Treatment	Completion Dates	Project Costs	Receiving Stream	Remarks
Crown Point	8,443	7,500	0.8	Act. Sludge + Cl_2	1953	$567,000	Beaver Dam D.- Deep River	Plans approved for plant additions
Hobart	18,680	23,000	2.0	Act. Sludge + Cl_2	1954- 1962	669,000 1,190,000	Deep River	-
East Gary	9,309	10,700	(1.5-3.0)	Trickling Filter	1960 (Impv.)	195,000 + (1)	Burns Ditch	Considering plant improvements or connection to Gary San. Dst.
New Chicago	2,312	-	-	-	-	-	(Deep River)	No sewer system

Note: It should be noted that Ogden Dunes and St. John, which have no sewer systems, were not included in the tabulation.

(1) The municipality financed part of the project with cumulative sewer funds.

Status of Municipal Sewage Works (continued)

Municipality	Pop. 1960	Design		Type Treatment	Completion Dates	Project Costs	Receiving Stream	Remarks
		Pop.	Flow, mgd.					
Valparaiso	15,227	20,000	2.0	Act. Sludge + Cl_2	1954 1959	$ 725,000 1,450,000	Salt Creek - L. Calumet R.	Engineer authorized to study need for plant additions
Chesterton	4,335	10,000	1.5	Act. Sludge + Cl_2	1963	720,000	L. Calumet R.	-
Porter	2,189	-	-	-	-	-	(L. Calumet R.)	Engineer authorized to plan sewage treatment
Portage	11,822	-	-	-	-	-	(Burns Ditch)	Preliminary report submitted No sewer system
Grand Calumet River - West								
Hammond	155,915(2)	490,000	36	Act. Sludge	1941 1959 1964	$3,250,000 19,663,000	Grand Calumet River	Need Cl_2 facilities and south side interceptor. The $19+ million includes that spent on sewers including storm and relief sewers
Whiting	8,137	-	-	-	1945-1949	100,000+	-	Intermittent raw sewage discharge to Lake Michigan
East Chicago	57,669	115,000	20	Act. Sludge + Cl_2	1945 1960	2,625,000 3,600,000	Grand Calumet R. - Ind. Harbor	
Gary	178,320	500,000+	60-80	Act. Sludge	1941 1965	4,818,133 25,408,000	Grand Calumet R. - Ind. Harbor	Cl_2 facilities under const., the $25+ million includes that spent on sewer work including storm and relief sewers
Merrillville Cons. Dist.	(4000 homes)	-	-	-	1966	$2,881,740	-	Sanitary sewer system to serve 4000 homes. Connection will be made to Gary San. Dist. Semi-public sewage treatment plants in area will be abandoned and connection made to sanitary sewers

(2) Includes population of Munster, Griffith, Highland and Whiting.

Semi-Public Sewage Disposal Facilities

Installation	Design Flow 1000 gal/day	Type of Treatment	Receiving Stream	Remarks
Little Calumet River - West				
Dyer Elementary School	10	Activated Sludge Chlorination	Hart Ditch - Little Calumet R.	To be connected to Dyer
Mount Mercy Sanatorium	5	Activated Sludge	Hart Ditch - Little Calumet R.	To be connected to Dyer
Wilbur Wright School	15	Septic Tank and Sand Filter	Tributary to Little Calumet	To be connected to Munster
St. Mary's Clericut	10	Activated Sludge Chlorination	Private lagoon	No outlet
Little Calumet River - Burns Ditch				
Lake County				
Lake County Home	100	Activated Sludge	Beaver Dam Ditch - Burns Ditch	Chlorination facilities appvd
Cressmor Trailer Park	6	Septic Tank and Sand Filter	Deep River - Burns Ditch	-
Melody Lane Mobile Home Park	26	Activated Sludge	Little Calumet River Burns Ditch	Chlorination planned for 1965
Sparton Corporation	-	Activated Sludge	Little Calumet River Burns Ditch	Need chlorination facilities
Ross Township Elementary School	7	Activated Sludge Chlorination	Turkey Creek - Burns Ditch	-
Schererville Elementary School (St. Johns Township)	7	Activated Sludge Chlorination	Turkey Creek	May be connected to Schererville

Semi-Public Sewage Disposal Facilities (continued)

Installation	Design Flow 1000 gal/day	Type of Treatment	Receiving Stream	Remarks
Schererville Hgts. Subdv.	17	Activated Sludge	Turkey Creek Burns Ditch	Need chlorination facilities
Turkey Creek Meadows Subdv.	104	Activated Sludge	Turkey Creek Burns Ditch	Chlorination to be provided if connection not made to Merrillville
Lake George Plateau Subdv.	92	Activated Sludge	Deep River Burns Ditch	Need chlorination facilities
Nob Hill Subdivision		Activated Sludge Chlorination	Deep River Burns Ditch	-
Viking Village Subdivision	52	Activated Sludge	Deep River Burns Ditch	Need chlorination facilities
Indiana Toll Road	125	Trickling Filter and Sand Filters	Burns Ditch	-
Little Calumet River - Burns Ditch				
Porter County				
Liberty Township School	19	Septic Tank Sand Filter	Little Calumet Burns Ditch	-
Portage Jr-Sr.High School	60	Activated Sludge Chlorination	Willow Creek Burns Ditch	-
St. Patrick's School	16	Septic Tank Sand Filter	Little Calumet Burns Ditch	-
Capitol Estates Subdivision	125	Activated Sludge Chlorination	Salt Creek Burns Ditch	-

Semi-Public Sewage Disposal Facilities (continued)

Installation	Design Flow 1000 gal/day	Type of Treatment	Receiving Stream	Remarks
Henry P. Fieler School	13	Septic Tank and Sand Filter	Turkey Creek Burns Ditch	-
Merrillville Primary School	3	Septic Tank and Sand Filter	Turkey Creek Burns Ditch	Will connect to Merrillville
Merrillville Grade School	21	Septic Tank and Sand Filter	Turkey Creek Burns Ditch	Will connect to Merrillville
Merrillville High School	28	Septic Tank and Sand Filter	Turkey Creek Burns Ditch	Will connect to Merrillville
Merrillville Bowling Alley	-	Activated Sludge	Turkey Creek Burns Ditch	Will connect to Merrillville
Skinner Shopping Center	-	Activated Sludge Chlorination	Turkey Creek Burns Ditch	-
Brookview Terrace Subdivision	103	Activated Sludge	Turkey Creek Burns Ditch	Need chlorination facilities
Chapel Manor Subdivision	103	Activated Sludge Chlorination	Turkey Creek Burns Ditch	Chlorination facilities in operation. Plan to connect to Merrillville
Garden Homes Subdivision	100	Activated Sludge Chlorination	Little Calumet River Burns Ditch	Approved 1962, not constructed
Innsbrook Subdivision	350	Activated Sludge Terminal Lagoon	Turkey Creek Burns Ditch	Also serves Bon-Aire Subdv
Lincoln Gardens Subdivision	200	Activated Sludge Chlorination	Turkey Creek Burns Ditch	Chlorination facilities in operation
Rolling Hills Estates Subdv.	35	Activated Sludge Chlorination	Turkey Creek Burns Ditch	-

Semi-Public Sewage Disposal Facilities (continued

Installation	Design Flow 1000 gal/day	Type of Treatment	Receiving Stream	Remarks
Riverside Subdivision	18	Imhoff tanks	Little Calumet Burns Ditch	-
Robbinwood Subdivision	37	Activated Sludge	Salt Creek Burns Ditch	Chlorination plans approved
South Haven Subdivision	100	Activated Sludge Chlorination	Salt Creek Burns Ditch	Chlorination facilities in operation
Indiana Toll Road Service Area	24	Activated Sludge Chlorination	Little Calumet Burns Ditch	Chlorination facilities in operation
Grand Calumet River (West)				
Federal Cement Tile Company	7.5	Activated Sludge	Grand Calumet River	Need chlorination facilities

Appendix 30

SEWAREN • NEW JERSEY • MERCURY 4-6400 **VULCAN DETINNING DIVISION**

VULCAN MATERIALS COMPANY

OFFICE OF THE PRESIDENT

January 11, 1965

Mr. B. A. Poole
Technical Secretary
State of Indiana
Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46207

RECEIVED
JAN 12 1965
STATE OF INDIANA
STREAM POLLUTION CONTROL BOARD

Dear Mr. Poole:

I write with reference to your letter of December 29, 1964, addressed to Mr. S. J. Alston, Jr., Plant Manager of our Gary, Indiana plant. In this letter, you advised us that we had been designated as a participant in a conference on interstate stream pollution to be held in Chicago on March 2, 1965.

On January 8, 1965, in a telephone conversation, we discussed what contribution our representative could make at this conference. I requested our name be omitted from the list and you acquiesced subject to receipt of information from us relevant to the matter in question. We offer the following summation.

Our Gary plant commenced operations in 1955 and since that date detinning tin plate scrap has been the principal function. We employ on an average approximately 45 employees. Sanitary waste is handled by a modern septic tank system with outfall to an extensive filter bed system. We do generate some process waste which to date has been discharged into the Grand Calumet River from an outlet on our property.

The approximate analysis of the solution is as follows:

Na_2O (as free caustic soda) 25 gms/liter
Na_2O (combined as sodium carbonate and other compounds containing carbon) 110 gms/liter
Na_2O Total -------------- 135 gms/liter
Calculated as all sodium carbonate, the amount is 230 gms/liter or approximately 2 lbs per gallon of solution.

The volume of solution is estimated to be approximately 2,800 gallons per day.

We have recently executed a contract to sell all of this waste material, deliveries to commence on or before March 1, 1965. It appears this waste with its alkaline content has a value for acid neutralization.

With the commencement of deliveries, the discharge of waste into the Grand Calumet will cease. It is for this reason we feel our participation in the conference would serve no useful purpose.

If there is additional information you may require, please do not hesitate to call on us.

Yours very truly,

VULCAN DETINNING DIVISION
Vulcan Materials Company

E. W. Young

E. W. Young
President

EWY/hb

Appendix 31.

STATE of INDIANA
INDIANAPOLIS 46207
STREAM POLLUTION CONTROL BOARD
1330 West Michigan Street
MElrose 3-4420

COPY

September 18, 1962

Department of Health, Education
and Welfare
Public Health Service
433 West Van Buren Street
Chicago 7, Illinois

Attention: Mr. H. W. Poston
Regional Program Director
Water Pollution Control

Gentlemen:

Re: Industrial Wastes
E. I. duPont de Nemours & Co., Inc.
and Inland Steel Company
East Chicago, Indiana

On August 8, 1962, E. I. duPont de Nemours & Co., Inc., East Chicago, submitted a preliminary proposal for the disposal of hydrochloric acid into the Grand Calumet River. On July 12, 1962, Inland Steel Company, East Chicago, submitted a preliminary proposal for the treatment of wastes from a new 80-inch Hot Strip Mill. The Inland proposal was considered satisfactory at the July meeting of the Stream Pollution Control Board, and it is anticipated that the Board will consider the duPont proposal during its September 25, 1962, meeting.

Both of these proposals were discussed with you with the understanding that the Board would be informed of your opinion as to the compatibility of these proposals with the long range planning of the Public Health Service in the Great Lakes basin. We provided you with a copy of the Inland proposal.

It is requested that your comments on both proposals be available for the September 25, 1962, meeting of the Board. It would be appreciated if you would submit separate letters, original and carbon, for each proposal; the original typing for our files and a carbon copy for the Company files. Also, the Inland proposal should be returned for retention in our files.

Very truly yours,

B. A. Poole
Technical Secretary

RAW/mlm

copied 2/65

MR. MILLER: The State of Indiana has been working for many years to improve and maintain the water quality in this area, in such condition that all users, present and future, have acceptable water. In an effort to overcome pollution problems in the south end of Lake Michigan and to collect data on which to base water quality criteria, the State of Indiana prepared in 1953 an outline of a proposed survey for the south end of Lake Michigan.

The survey was to be undertaken and financed by Indiana, Illinois, Department of Water and Sewers of the City of Chicago, the Metropolitan Sanitary District of Chicago, Public Health Service, and municipal and industrial interests. This survey was to be conducted over a two-year period at a cost of about $250,000. The survey was not undertaken because of the failure to reach an agreement with all parties concerned.

In 1935, the first comprehensive stream pollution abatement law was passed, and under the provisions of the law, the Cities of Chicago, Gary, Hammond, and Whiting were ordered, in 1937, to abate pollution of the Grand Calumet River, the Indiana Harbor Canal, and Lake Michigan.

East Chicago, Gary, and Hammond complied by formation of Sanitary Districts and the construction of sewage treatment works.

The Indiana Stream Pollution Control Board policies are defined as existing pollution must be eliminated as soon as possible.

All wastes, from new outlets to state waters must be adequately treated prior to discharge, and adequate waste treatment must be included as part of the industrial expansion or sanitary sewer system enlargement where proposed and where adequate facilities were not available.

The Board has been constantly active in pursuing its objectives in the Indiana-Calumet area. This statement is emphasized by the fact that the Board issued 15 industrial waste treatment facility approvals during the period of 1961-62, '63, and '64.

The estimated expenditures for these facilities is $48,285,000. Two of these projects were submitted to the Public Health Service for comment in 1962.

Both Inland Steel Company and E. I. duPont de Nemours and Company, East Chicago, planned extensive water pollution control works, and the Board requested the Public Health Service to comment on the compatability of these projects with the long-range for pollution control in Lake Michigan. The Public Health Service did not comment on either project.

Final determinations of the additional treatment that will be required for industrial wastes must await completion of the Great Lakes River Basin Survey now being conducted by the Public Health Service. The report of this survey is expected to contain water quality criteria which are needed to determine additional' treatment needs for each waste discharge.

Indiana recognizes its obligation to provide improved water to the neighboring state of Illinois. Water quality monitoring data from Indiana Harbor Canal and Burns Ditch show water quality has not deteriorated.

Samples at these stations are collected twice each month and the result of these samples are included in the appendix of the report.

The water of Lake Michigan is usable for public water supply and there is no threat to the health of the people by this use. The Board, even with increased industrial activity and population growth, has not lost ground in making and maintaining water quality in Lake Michigan.

The Indiana portion of this area is included in two counties, Lake County and Porter County. Since the turn of the century, Lake County, Indiana, has experienced a tremendous rate of growth.

In 1900, the county had 37,892 inhabitants, while the 1960 census showed a population of 513,269 persons, an increase of 1,250 percent.

It should be noted that 84 percent of the Lake County population is located in the upper third of the county, along the shores of Lake Michigan, and the major watercourses of the Calumet Basin.

Porter County has also experienced accelerated growth since 1940. The increase between 1940 and 1960 was 117 percent as compared at or to an increase of only 45 percent between 1900 and 1940.

The growth of Porter County is expected to increase at even a greater rate due to the recently completed Midwest Steel Division, National Steel Corporation plant, located at Burns Ditch and Lake Michigan; the Bethlehem Steel Corporation plant now under construction just east of the Midwest plant, and the proposed Burns Ditch port and harbor development.

There are 33 industries with separate outfalls to Calumet-Lake Michigan Basin. The attached map shows the location of these industries, the cities and towns, and the major watercourses of the Indiana-Calumet region.

More than 83 percent of Lake and Porter County population is located in 20 incorporated municipalities within the Calumet River Basin. Five of these with a 1960 population of 18,398 have new sewer systems. Twelve, representing 98 percent of the sewered urban population, provide sewage treatment. The remaining three are under Board order to abate pollution of receding waters and two now have projects under construction.

The last municipality has engaged an engineer to study its sewage works needs.

Fifteen municipalities in the Calumet River Basin have invested approximately $72,400,000 in sewerage and sewage treatment facilities during the past 30 years.

Approximately $61,000,000 of this has been spent since 1950. Eight sewage treatment plants serve 12 municipalities. Two plants are under construction. The remaining one with sewers has a project under construction to connect to an existing plant.

These plants provide secondary treatment and five have chlorination facilities. Of the five towns without a sewer system, Portage submitted a preliminary engineering report on sewers and sewage treatment to the Board in 1962.

The East Chicago, Gary, and Hammond Sanitary districts account for more than 82 percent, $59.4 million of the $72.4 million invested cost noted above.

East Chicago, completed major sewage treatment plant improvements in 1960; the Hammond plant improvements were completed in 1964, and the Gary improvements were placed under construction late in 1962.

Hammond has completed storm sewer separation projects with discharge of storm water to Wolf Lake, and Gary has completed separation in one area and has one project under construction.

Both cities are planning additional storm sewer separation. In addition, Highland, Hobart, Munster, and Schererville are providing separate sewers in new development areas and other communities have been advised of the necessity of planning for separate storm and sanitary sewers.

There are 37 semi-public installations in the Calumet River Basin with sewage treatment facilities discharging to receding waters. As municipal sewers become available, many of these plants will be abandoned.

Industry has expended or committed approximately $73,200,000 for treatment facilities in the Basin. Approximately $50,000,000 has been spent or committed since 1950.

Approximately $53,500,000 have been expended or committed by eight major steel plants. Currently, the steel industry is experiencing a period of major plant renovations and considerable sums are being spent and will be spent for adequate industrial waste treatment facilities.

One of the outstanding industrial waste treatment facilities of the country is at the new plant of the Midwest Steel Division, National Steel Corporation, Portage.

The facilities include an activated sludge plant with chlorination of the effluent. Industrial waste treatment consists of acid-alkali neutralization, oil emulsion breaking with terminal coagulation and settling, and deep-well injection of waste pickle liquor.

The approved sewage and industrial waste facilities which are under construction at the Burns Harbor plant, Bethlehem Steel Company, Chesterton, will be equally extensive and, further, a terminal lagoon will be included.

All oil refineries in the Basin provide API oil separators. Approximately $15,000,000 of the $73,200,000 total has been expended by four major oil companies.

Sinclair Refining Company, East Chicago, is an excellent example of water reuse. The Company utilizes cooling tiers with a total in-water recirculation of 168,000 gallons per minute and a waste discharge of 3,500 gallons per minute.

American Oil Company, Whiting, provides biological treatment for oxidation of dissolved organics and removal of oils.

These accomplishments by municipalities and industries have been possible in many cases with no legal action necessary. The Board operates on a basic policy of education and persuasion rather than compulsion. However, legal action is undertaken, if necessary, in cases where improvements are not made within a reasonable time. This policy has been successful.

Since 1943, it has been necessary to take 13 enforcement actions in the Basin.

The following list shows these municipalities and industries.

We will summarize it in here. There have been ten orders issued to municipalities and these are Highland, Munster, Valparaiso, Crown Point, Hobart, Griffith, Dyer, Hammond Sanitary District, Schererville, and Porter.

The other three cases involve Whiting and two cases with Lever Brothers Company, and these were ended by stipulation.

In April 1964, the Technical Secretary of the Board requested those public and semi-public sewage treatment plants needing effluent chlorination facilities to submit a timetable for provision of the necessary facilities.

The following list shows the status of the municipal chlorination facilities.

Chesterton has facilities in operation. Crown Point has facilities in operation. East Chicago is chlorinating in the effluent channel. East Gary, Miller District, no facilities, considering connection to Gary's main sewage treatment plant.

Gary, under construction; Hammond, submitted preliminary report for chlorination facilities.

Hobart, facilities in operation; Valparaiso, facilities in operation; Dyer, under construction; Schererville, under construction.

Of the 37 semi-public sewage works installations in the Basin at least eight plan to connect to municipal sewers in the near future. Twelve of the remaining 29 provide effluent chlorination facilities; one provides a terminal lagoon; five have sand filters, and four have plans for acquiring chlorination facilities approved and/or are planning construction of facilities in 1965.

Efforts will be continued to obtain effluent chlorination facilities at the seven other installations.

Surface water is used by 13 Indiana communities. Lake Michigan water in the area under consideration, even with the existing local pollution, is, in general, of good quality. The water purification plants, with a minimum of treatment, produce a safe and excellent quality of water at all times.

The water east of the Indiana Harbor breakwater is generally very good. This is borne out by the remarks of Mr. Leo Louis, President of the Gary-Hobart Water Corporation, to Senator Birch Bayh in a letter dated February 10, 1965:

"The second filtration plant, now under construction, is being built in the southwest corner of the Town of Ogden Dunes adjacent to the Inland Steel Company property. The primary reason we moved that far east was because we were unable to obtain other property and access to the lake closer to Gary. Water quality had nothing to do with our decision to move to the Porter County site.

"In general, our raw water supply is very good, and, while we do have some periods of unsatisfactory water which results in some increased chemical costs and increased technical supervision techniques, we have never complained too much about these problems.

"We are anxious, of course, to keep pollution in the lake to a minimum, but we have been willing to undertake some increased treatment costs realizing that Lake Michigan water is so very much better than many other utilities in other parts of the country have to deal with. We are also cognizant of the fact that we are located in an industrial area, we serve large industries with at least part of their water supply, and we are anxious to have other industries locate in our area to promote the growth of the area and our water system."

The water north of the Calumet Harbor breakwater is generally very good. The Department of Health, Education, and Welfare report for this conference shows in a table summary of raw water problems, table VIII-1 for the Chicago South District Filtration Plant, 1963-64. This table included 23 days in 1963 and 12 days in 1964 of hydrocarbon odors, indicating a relatively few days of problems of this type.

I might say that Mr. LeBosquet increased the number of days in 1964 to 20 and yesterday Mr. Gerstein used the figure of 8 and we did not have this report when we were writing this one.

It is believed that the water supplied Chicago citizens on these days was safe and of excellent quality, and I am happy to say that I was sure of this when this was written, but since we did not have the reports, this is the best we thought we could do, and Mr. Jardine and Mr. Gerstein assured all of you yesterday that at no time had there been occasions when the water was not safe that was furnished the consumers in Chicago.

The water quality between Calumet Harbor and Indiana Harbor breakwaters is poor. The report of Health, Education, and Welfare indicates there are flow reversals in the Calumet River resulting in pollution of Lake Michigan in Indiana.

Officials of the Hammond water purification plant have reported high threshold odors with accompanying high carbon dosage to remove the odor when winds are from the north and northwest indicating water movement from Calumet Harbor to the Hammond intake.

Popcorn slag has been found on all beaches between the two breakwaters and the sources of this slag are U. S. Steel, South Works, and Wisconsin Steel Works in Chicago, indicating water movement from Calumet Harbor to Indiana.

Water movement is also from Indiana

north when winds are from the south. Hammond and Whiting water purification plants report more days of high threshold odor than the other water plants in the south end of Lake Michigan; however, water supplied by Hammond and Whiting is safe and does not jeopardize the health of the consumers.

On June 12, 1964, the Department of Health, Education, and Welfare submitted a report entitled, "Preliminary Draft, Report on Sampling of Industrial Wastes, Indiana Portion-Calumet Area," to the Board.

The report listed analyses of samples collected by Great Lakes-Illinois River Basin personnel from industrial waste sources in Indiana. Based upon information contained in the report, the Board in June and September 1964 requested the following companies to develop comprehensive industrial waste programs with timetables: U. S. Steel Corporation, Gary Steel Works, Gary: U. S. Steel Corporation, Gary Sheet and Tin Mill, Gary; Youngstown Sheet and Tube Company, East Chicago; Inland Steel Company, East Chicago; Mobil Oil Company, East Chicago.

All responded and submitted information on what was being done and planned for the future to reduce pollution.

Water quality in the southern end of Lake Michigan is of utmost concern to the Board. On

December 14 and 15, 1964, after studying the operating records of the Hammond, Whiting, and East Chicago and the Gary-Hobart water treatment plants and noting the amount of activated carbon which was used to remove tastes and odors, the Board requested ten companies to redouble efforts to improve housekeeping by eliminating or holding to an absolute minimum the wastes discharged to plant sewers; to eliminate the dumping of wastes of non-saleable compounds to the sewers and watercourses, and to improve, where possible, the operation of existing treatment works.

In April of 1957, a state-wide water quality monitoring program was established. Samples are collected by State Board of Health personnel and cooperating agencies at each station on a bi-weekly schedule; the results of analyses at these stations are published each year on a calendar-year basis; and they are included in the appendix of this report.

We started with three stations. One of these was on the Grand Calumet River at Hohman Avenue; the Little Calumet River at Hohman Avenue and Lake Michigan raw water intake of the Whiting water works.

Since that time, we have added ten additional stations including Burns Ditch at Dickey Road on the Indiana Harbor Canal.

In order to make a final determination of the treatment requirements for some of the industries in the Indiana Calumet region, water quality criteria must be established. Without the necessary data on water quality in the area and on the sources of waste discharges, criteria cannot be easily determined.

It is understood that the Great Lakes-Illinois River Basin project now in the final phases of its Lake Michigan activities, will provide these data. Therefore, establishment of water quality criteria should be one of the objectives of this conference.

The present problems of water quality in the Calumet-Lake Michigan area can be summed up in the following paragraphs which were a part of the State of Indiana's testimony at a Public Hearing concerning the Nation's Water Pollution Problems for the House Natural Resources and Power Subcommittee of the Committee on Government Operations, held in Chicago September 6, 1963.

"While much has been accomplished by the treatment of sewage and industrial wastes in the Indiana Calumet region, there are still problems. Some of these are extremely complex and there are always dangers of over-simplification.

"Notwithstanding this and the lack of the

Great Lakes-Illinois River Drainage Basin Report of the Public Health Service, the following general statements can be made as to the water quality needs of this area:

"Tastes and Odors: Organics in the waters of the Indiana Harbor Canal and in effluents going directly to the Lake contribute to the taste and odor problems of some of the cities that use water from the south end of Lake Michigan. Better housekeeping and more careful operation of existing treatment works will resolve some of these problems. However, removal of a higher percentage of these organics at their source is essential if the water supplies are to have a continuously satisfactory raw water.

"'Coliforms: Coliform bacteria counts are too high in all streams. These, unlike tastes and odors which are due almost entirely to industrial wastes, have their origin in city sewage. They are of particular significance in the Indiana Harbor Canal and in Burns Ditch since these waters outlet into Lake Michigan.

"'Significant reduction will take place in the Little Calumet and Grand Calumet Rivers on completion of the construction work at Hammond, Griffith, Munster, Highland, Dyer, and Schererville. The work under way at Gary will reduce counts in the Indiana Harbor Canal. Full control of the high coliform counts cannot be expected until combined sewers are eliminated. Sewer separation is costly and time consuming. Work has been started in Gary, Hammond and some of the smaller cities, but this involves only a small percentage of the total problem.

"'Solids: Upon completion of the municipal treatment works now under construction the solids getting to the waterways will be largely of an inert nature. While they have little bearing on the quality of Lake Michigan, additional solids removal in the Grand Calumet-Indiana Harbor Canal drainage area is indicated.

"'Aesthetic Considerations: It is not reasonable to expect waters draining highly industrialized areas to have the same appearance as waters draining undeveloped areas. But one can expect them to be reasonably free of floating material, sludge banks and color. Accomplishment of the objective outlined above will do much to improve the appearance of the waters of the region.'"

The physiography of the entire Calumet Basin is such that gradients of most streams in the area are flat, providing sluggish conditions and poor natural purification capacity, and many low, swampy areas are located in the Basin.

Because of these conditions, the Grand Calumet and Little Calumet Rivers normally flow in two directions. Both flow west into Illinois and east into Lake Michigan via the Indiana Harbor Canal and Burns Ditch, respectively.

However, during periods of heavy storm runoff, these two rivers reverse flow and water from Illinois enters Indiana and thence to Lake Michigan. This condition also exists in the Calumet River of Illinois and its waters carrying industrial wastes and storm water overflow from the Metropolitan Sanitary District enters Lake Michigan, including the Indiana portion of Lake Michigan.

In order that the new O'Brien Lock may operate without the diversion of Lake Michigan through the Grand Calumet River, a temporary barrier dam must be constructed. Sites under consideration are in the vicinity of Hammond and East Chicago.

The Public Health Service wants the dam so located that the effluents from the Hammond and East Chicago sewage treatment plants are diverted into the Illinois River Basin. It is believed that the same degree of treatment may be necessary whether the wastewater effluents flow to the Illinois River Basin or to Lake Michigan.

For the remainder of this report, information, data, and discussions will be presented by drainage basins as follows: The Grand Calumet River-Indiana Harbor Canal-Lake Michigan; the Little Calumet River-Burns Ditch; Little Calumet River West; Grand Calumet River West; and Wolf Lake.

CHAIRMAN STEIN: Well--

MR. POSTON: May we ask questions here?

CHAIRMAN STEIN: I think that would be all right if you want to. Do you have any questions?

MR. POSTON: I'd like to clarify one thing here and ask Mr. Miller whether or not normally the effluent, the treated effluent from Hammond sewage treatment plant, flows to the east or to the west; that is, whether it flows toward Lake Michigan or towards Illinois?

MR. MILLER: It has been my experience and observation that the divide seems to be at the Indianapolis Boulevard and the effluent from the Hammond plant flows west into Illinois.

MR. POSTON: This probably is regulated some by elevations of the lake and the river system but generally it flows towards the west then?

MR. MILLER: This is true. This is based upon U. S. gaugings that I have seen and also observations.

CHAIRMAN STEIN: Mr. Chesrow.

MR. CHESROW: Mr. Miller, will you identify the two rivers by flow--that flow, reverse flow in water from

Illinois into Indiana and thence to Lake Michigan?

MR. MILLER: We have had at times storm runoff water in both the Little Calumet and Grand Calumet that have come back.

MR. CHESROW: Our hydraulic engineer, Mr. Brown-- Are you familiar with this?

MR. BROWN: Yes.

MR. CHESROW: Is the statement correct?

MR. BROWN: No, it is not.

CHAIRMAN STEIN: By the way, I think the way the conference has to work is that when the Sanitary District gets this, and you may know the problem here, and I am sure the issue will be joined when you make your presentation.

MR. CHESROW: Thank you.

MR. POSTON: I'd like to ask one more question for clarification purposes.

I notice you talked about housekeeping here and I wondered if you feel if some immediate cleanup might not be possible for some of the wastes which we saw in the film; that is, gross oil pollution, heavy masses of oil, and solid material, if some of this might not be cleaned up by housekeeping methods almost immediately?

MR. MILLER: Well, I would say that I think the first thing you always do in industrial waste treatment is look after the housekeeping and eliminate the wastes at the source. This is certainly a thing that should be done and it would appear from some of the material that is in the Indiana Harbor Canal, particularly, improvement in housekeeping would reduce these.

MR. POSTON: Well then, I'd like to follow this up a little bit further in terms of seeing that this job is done.

Do you feel that you have adequate staffing to provide surveillance so that you can determine whether some of these gross pollution spills--maybe we can call them-- can be controlled more adequately?

MR. MILLER: Go ahead.

MR. POOLE: That is a loaded question.

(Laughter.)

I think an honest-to-goodness answer to that question would be no. That is, I am sure practically everybody in this audience knows, we, like any other state, have limitations on personnel, personnel limitations. As far as our having adequate staffing to prevent spills in industry, I don't know how any regulatory agency can do that sort of thing having a man stationed in the industry all the time.

This we can't do. I think we do have

adequate staffing, and bearing in mind the importance of the problem in this particular area to do a reasonable amount of surveillance.

We hope, when we move into our next fiscal year which begins in July, if the Legislature which is closing up this week isn't too rough on us, we will have the money for a fairly sizeable expansion in our staff, and we can do a better job after that than we can now.

I am not trying to duck your question, Mr. Poston, but you realize that--

MR. POSTON: That is a satisfactory answer.

I have one other question.

I noticed that a chlorination is indicated, that you have a number of plants chlorinated. Is your requirement on municipal wastes or those wastes that possibly carry bacteria and pathogens to the streams, is it your requirement that you chlorinate all municipal wastes?

MR. MILLER: I think I read to you in the report, and the reports indicated that in April 1964, we requested all of the municipalities, the semi-public installations that would be treating sanitary sewage to provide chlorination facilities or to give us the timetable for construction of these facilities so we are on record with all of these as requiring chlorinations of their effluents.

MR. POSTON: Thank you. That is all I have.

CHAIRMAN STEIN: Mr. Klassen.

MR. KLASSEN: I am going to reserve most of my questions, Mr. Miller, on the details when the cities and the industries speak. I'd like some firsthand information from them. You probably have it, but I'd like to get their answers.

But referring to your report, at the top of page two, coming back to this question of cyanide again, you refer to SPC-2 which is the regulation in Indiana for the discharge of cyanide.

What maximum effluent strength charge of cyanide is permitted to Lake Michigan?

MR. MILLER: Well, I'd say to you that regulation SPC-2 is specifically designed for the containment of concentrated cyanide solutions so these cannot be accidentally or intentionally discharged into a stream. Each discharge is considered by the Board on its own merits -- the downstream water use made of the receding waters -- and we have no effluent requirements that have been established for discharge in the Lake Michigan Basin.

MR. KLASSEN: Does this apply to other

waterways other than Lake Michigan in this area?

MR. MILLER: This is true.

MR. KLASSEN: And then, the top of page 3, just a question of interest only because I am--I may be passing through there and drinking the water some day--

(Laughter.)

--There is a statement and this is the next question. This is the top of page 3, the second sentence, the second paragraph, concerning the water quality monitoring.

It said, "It shows that the water quality in the Indiana Harbor Canal and in Burns Ditch had not deteriorated."

Can you give us a date of comparison since the day before or two years ago or 1960 or just some date there?

MR. MILLER: Actually, the monitoring data for Lake Michigan is for an 8-year period, and the date for Dickey Road is a 5-year period.

MR. KLASSEN: It could be that it hasn't gotten any worse, because--I am not trying to be facetious, that it was bad to start with and it didn't get any worse because it's still bad, could this be?

MR. MILLER: This is a question that--in the period covered, this is what the date shows.

(Laughter and applause.)

MR. KLASSEN: Also on the top of page 4, this does concern me. I presume that all of the studies of information which have gone into this--that the injection, apparently, of wastes underground into wells inasmuch as possibly Illinois groundwater might be involved, and certainly groundwater, and I know you have gone into this, but what is the final conclusion in the thinking, the study, that went into the injection of pickle liquor underground so far as the underground water resources are concerned?

MR. MILLER: I might say that the Board conferred with the State Geological Department--I worked very closely with them--and the Department of Conservation. It, too, has geologists, and we were very cognizant of the protection or the need to protect the groundwater resource. These disposal wells are all in waters called the Mount Sinon formation and the Lake County area.

This is somewhere around 2,400 feet on down to about 4,200 or 4,500 feet. In all of these wells; we have required that they put down at least a double casing and a grot from the bottom up and the annular space between the two spacings, the grots between the outer casing and the ground. The wastes are put in through an injection and the water is in the inner casing and is monitored, also; and in this way, we are endeavoring to protect all the fresh water acquifers in the area.

MR. KLASSEN: Then, on page 9--I say this concerns me, from a public health standpoint. You quoted a letter from Mr. Leo Louis of the Gary-Hobart Water Corporation on the top of page 9.

I sense in here what he has said, and if I am incorrect, please correct me, that they are anxious to keep pollution at the minimum but he is willing to take it and treat it.

I am wondering, and it does go on to say that industries require water and we know that industries require water.

I am wondering in this statement, for my own knowledge of water treatment, whether you know whether Mr. Louis is basing this on any medical opinion, as to what he might be treating and what the products that might be in the final water as delivered to the consumers might be?

MR. MILLER: Well, Mr. Leo Louis is a participant and he has a statement to present, and you can ask him this question. I can't speak for him.

MR. KLASSEN: Will he be here?

MR. MILLER: Yes, sir.

MR. KLASSEN: O.K., that is all.

MR. POSTON: I'd like to read a little of the thinking about a hundred years ago. It might help Mr. Klassen in determining the changes in the lake, and this is a hundred years ago, and it is from the Tribune and other sources, your historical scrapbook, and it is dated January 13, 1865, and it says:

"The Tribune is against the proposal to get Chicago's drinking water from Lake Michigan. Nobody will drink from a hog's head however large if he sees a putrid rat floating on the surface."

(Laughter.)

"To expect the people of Chicago to drink water from the lake even though the tunnel be successful and be taken to a point two miles from shore while the sewer system for the dwellings for 200,000, soon to be 500,000 people, and the concentrated filth and abomination from innumerable slaughter, rendering establishments, and distillers are constantly poured into Lake Michigan is a most palatable absurdity."

I would submit, Mr. Klassen, that ideas have changed in these hundred years.

MR. KLASSEN: Yes, but not the Tribune's ideas because they are still against it.

(Laughter.)

They are still against pollution going into the lake, as I understand it.

CHAIRMAN STEIN: I am glad you finished that sentence, Mr. Klassen.

(Laughter.)

MR. KLASSEN: They have always been for clean water and this, I might say from personal knowledge, that Col. McCormick has been one of the real aggressors in this area for clean water.

There are a number of reasons for this but we all appreciate the support that we have gotten from the Tribune.

CHAIRMAN STEIN: I told you Indiana Day would be interesting Do you see the conferees are beginning to warm up.

(Laughter.)

Would you continue, Mr. Miller?

MR. MILLER: This presentation will be on the Basin, Grand Calumet-Indiana Harbor Canal--Lake Michigan. Mr. Eklund is going to help me and point out the location of the industry when I get to them.

The Grand Calumet River originates near the eastern border of Lake County. Practically all of the dry-weather flow in the river is industrial cooling and process water, and waste treatment plant effluents.

Thus, the flow varies depending on the amount of water used by industry and municipalities. Generally, the flow returns to the lake via the Indiana Harbor Canal; however, the direction of the flow in the canal can be in either direction depending on the lake level.

The river and canal receive the treated waste effluents from the East Chicago and Gary Sanitary Districts, numerous industries and some untreated industrial wastes. Samples collected from the canal at the Dickey Road water quality monitoring station revealed high coliform counts. It is discolored and contains oil and other floatable material.

In addition to the wastes introduced to Lake Michigan through the canal, the lake received effluents from seven industries and three power plants.

The Sanitary Districts of East Chicago and Gary provide adequate sewage treatment facilities. East Chicago provides effective chlorination in the effluent channel and effluent chlorination facilities are now under construction at Gary. The facilities are well operated and maintained and produce a good quality effluent. Construction of plant additions at Gary necessitated some bypassing of raw and inadequately treated sewage; however, primary and secondary treatment are now provided.

Storm water pumping stations and storm water overflow from combined sewers discharge storm water to the Grand Calumet River and Indiana Harbor Canal. Hammond and Whiting have combined sewer overflows that discharge storm water overflows and, at times, all flow to Lake Michigan. The discharge from these installations will continue to impose a bacteria and organic load on receiving waters.

The effluents from industry comprise most of the flow in the river and canal. The Board and industry are aware that additional pollution abatement facilities may be required after water quality criteria are established. With these criteria, Indiana will require industry to re-evaluate wastewaters and install the necessary facilities.

East Chicago: The City of East Chicago is served by a combined sewer system and an activated sludge type sewage treatment plant, chlorination is provided in the effluent channel.

The plant is designed for a population equivalent of 115,000 and a flow of 20 million gallons per day. The City does not accept appreciable quantities of industrial waste for treatment. The plant provides approximately 95 percent treatment in terms of 5-day B.O.D.

The facilities are well operated and maintained. The effluent is discharged to the Grand Calumet River and, under normal flow conditions, the flow is east to the Indiana Harbor Canal. Storm water overflow from combined sewers and storm water pumping stations discharge to the Grand Calumet River and Indiana Harbor Canal.

On April 22, 1964, the Board advised the District of the requirement for continuous chlorination of plant effluent. The District advised on May 25, 1964, that chlorination would be provided in the effluent channel with existing facilities. The effluent channel provides in excess of 15 minutes detention time at design flow.

Gary: The City of Gary is served by a combined sewer system and an activated sludge type sewage treatment plant. Effluent chlorination facilities are under construction.

When construction of plant additions is completed, it will provide for a design flow of 80 million gallons per day; aeration tank capacity which provides 6-hour detention at a flow of 60 million gallons per day and a population equivalent of over 500,000.

The plant provides approximately 95 percent reduction in terms of 5-day B.O.D.; the facilities are well operated and maintained. The effluent is discharged to the Grand Calumet River. Combined sewer overflows and storm water pumping stations discharge to the Grand and Little Calumet Rivers and Burns Ditch.

Chlorination facilities were not included in the plans; however, the Board approval was conditioned on provision of effluent chlorination facilities. Plans for chlorination were approved on July 19, 1963. Construction of chlorination facilities, and additional sewers is underway.

Merrillville Conservancy District: The Merrillville Conservancy District was established on December 28, 1962, to serve 2,647 parcels of land of which 1,277 were then undeveloped. It was estimated that 4,000 homes could ultimately be served within the original District boundaries. Since it was established additional area has been included and a contract for sewage treatment signed with the Gary Sanitary District.

Completion of these facilities will provide for abandonment of semi-public sewage treatment facilities now serving the Merrillville Bowling Alley, Merrillville primary, grade and high schools--this is three sewage plants--and Chapel Manor Subdivision.

Vulcan Materials Company, Gary: Mr. E. W. Young, President, Vulcan, notified the Board on January 11, 1964, that on or before March 1, 1965, all wastewaters would be eliminated from the Grand Calumet River.

The plant located in Gary in 1955 for the purpose of recovering tin from scrap tin plate. Approximately 2,800 gallons per minute of wastewater is discharged to the river. Mr. Young indicated that as of March 1, 1965, this wastewater will be sold. All sewage is treated in a septic tank-absorption field system. The estimated expenditure of water pollution control facilities is $12,000.

Cities Service Petroleum Company, East Chicago: The Company pumps process water from Lake Michigan and has a pumping capacity of 115 million gallons per day. Plant wastewaters are separated by three sewer systems; Sewage, process, and cooling.

All plant sewage is discharged to the East Chicago Sanitary District sewerage system. Cooling water and boiler blowdown is treated in an A.P.I. oil separator which was constructed prior to 1943. In 1949, a second A.P.I. oil separator was placed in operation for treatment of process wastewaters. The cooling water flow is 77 million gallons per day and the contaminated process wastewater flow is 4.3 million gallons per day. These flows are combined after treatment and discharged to the Grand Calumet River.

In 1961, an ammonia and sulfide sour water stripper was placed in operation. Stripper bottoms are discharged to the crude oil desalter for removal of phenols. Spent caustics are sold for recovery of cresylic acid. Spent sulfuric acid is returned to the supplier for reprocessing. Hydraulic decoking waters are recirculated. An experimental column trickling filter and an experimental activated sludge plant are installed for additional treatability studies of the process wastewater.

Plans for 1965 involve the discharge of delay coking unit waters to the sour water stripper, and an automatic effluent monitoring system. About $1,745,000 has been expended by the Company for water pollution control facilities.

E. I. duPont de Nemours and Company, East Chicago: The Company purchases potable water, 2.2 million gallons per day, from East Chicago and pumps process water, 11.5 million gallons per day, from the Grand Calumet River. In 1947, all plant sewage was connected to the East Chicago Sanitary District sewerage system. Acid neutralization for sulfuric acid production wastes was installed in 1957.

In 1962, the Company requested approval of a proposal to discharge up to 90,000 pounds per day of chlorides to the river. The chlorides are contained in by-product hydrochloric acid wastes. The proposal was submitted to the Public Health Service for comment. It was requested that the Public Health Service inform the Board as to the compatibility of the proposal with the long-range planning of the GLIRB project. We have been unable to extract an opinion from the Public Health Service on this proposal.

The Company was willing to neutralize the wastes but suggested controlled discharge for the following reasons.

Neutralization would increase the hardness and soluble salt content of the river.

Controlled discharge would only decrease natural river alkalinity by 25 milligrams per liter; and the chloride content of the river would be increased 18 milligrams per liter at average flow and neutralization would not change the value.

The Board approved the proposal with the understanding that the Company make an effort to sell the acid rather than discharge it to the river. The Company subsequently notified the Board that the acid would be sold and no chlorides were discharged to the river through this source.

The Company currently discharges under

controlled conditions calcium sulfate, calcium salfamate, sodium dichromate, ammonia and herbicide production wastes to the river.

I might say on the herbicide wastes, we require bio-analysis and information from the company to date that this would not have any harmful effects upon the water.

About $115,000 has been expended by the Company for water pollution control facilities.

U. S. S. Lead Refinery, Inc., East Chicago: The Company uses the Grand Calumet River for cooling water. The spent cooling water is returned to the river. No process wastewaters are discharged to a surface stream. About 45,000 gallons per year of process wastewater are discharged to a ground absorption basin. In 1947, all plant sewage was connected to the East Chicago Sanitary District sewerage system. About $27,000 has been expended for water pollution control facilities.

General American Transportation Corporation, Plant 2, East Chicago: All plant sewage is discharged to the East Chicago Sanitary District sewerage system. Process wastewaters, and I have .2 million gallons per day and Dr. Gutzeit informs me that it should be .02, are treated in the following facilities: Waste equalization pond, oil separator, and chemical treatment plant.

The chemical treatment plant consists of coagulation, flocculation, and clarification. The treated process wastewaters are discharged to the Indiana Harbor Canal. About $200,000 has been expended for water pollution control facilities.

Blaw-Knox Company, East Chicago: Potable and process water, 1.0 million gallons per day, is purchased from East Chicago. All sewage is discharged to the East Chicago Sanitary District sewerage system. Processed wastewater is treated in settling tanks and filters prior to discharge to the Indiana Harbor Canal.

American Steel Foundries, Indiana Harbor Works, East Chicago: All sewage is discharged to the East Chicago Sanitary District sewerage system. Process waters, 0.4 million gallons per day, are pumped from the Indiana Harbor Canal. Processed wastewaters are treated in a settling basin prior to discharge to the Indiana Harbor Canal. About $15,000 has been expended for water pollution control facilities.

Linde Air Products, East Chicago: All plant sewage and process wastewater, except cooling tower blowdown, is discharged to the East Chicago Sanitary District sewerage system.. Cooling tower blowdown is discharged to the Indiana Harbor Canal.

Mobil Oil Company, East Chicago: The

Company purchases potable water from East Chicago and pumps process water from the Lake George Branch, Indiana Harbor Canal. In 1947, all plant sewage was connected to the East Chicago Sanitary District sewerage system.

In 1933, and 1935, oil traps were provided for process wastewaters. In 1940, the following wastewater treatment facilities were installed: A.P.I. oil separator, raw process water treatment plant, and cooling towers for water reuse. The cooling towers reduced the process water pumpage from the canal from 26 million gallons per day to 1.5 million gallons per day.

Spent caustics are separated for use in the wood pulping industry and for recovery of cresylic acid. All spent sulfuric acid is returned to the supplier for reprocessing. Separation tanks and an oil separator are provided for ballast water.

The company recently installed an ammonia and sulfide stripper for stripping sour accumulator. The stripper will significantly reduce ammonia, sulfide, phenol, C.O.D. and B.O.D. in the wastewaters. About $600,000 has been expended by the Company for water pollution control facilities.

There is an unidentified source of pollution in the storm sewer discharging to Lake George Branch, Indiana Harbor Canal, East Chicago. An unidentified source of wastewater discharged to the Lake George Branch, Indiana Harbor Canal, was investigated on February 3, 1965. The wastewaters discharge to the Lake George Branch via a storm sewer located on the northeast side of Indianapolis Boulevard. The sewer originates in the vicinity of the American Oil Company, Whiting. Two storm sewers, one on the northeast side and one of the southwest side, parallel Indianapolis Boulevard to the vicinity of Riley Avenue.

At Riley Avenue, the southwest sewer crosses under Indianapolis Boulevard and is connected to the northeast sewer which drains to Lake George Branch.

Estimated flow in the sewer on February 3, 1965, was 50,000 gallons per day. The wastewater was light in color and had a gasoline odor. The source of the wastewater has not been identified.

Calumet Nitrogen Products Company, Hammond: The Company is jointly owned by American Oil Company, Whiting, and Sinclair Refining Company, East Chicago. The plant is operated by American Oil Company. The plant located in Hammond in 1956. Ammonium nitrate plant wastewater and all sewage is discharged to the Hammond Sanitary District sewerage system. Wastewater from the ammonia plant plus cooling tower blowdown is discharged to a separation basin for removal of settleables and floatables.

The basin effluent drains to the Lake George Branch,. Indiana Harbor Canal. Approximately $50,000 has been expended by the Company for pollution control facilities.

The Union Tank Car Company, Whiting: The Company's activities involve the construction and maintenance of railroad tank cars. Potable and process water is purchased from Whiting. Approximate water usage is .2 million gallons per day. All sewage is disposed in septic tank-absorption field systems. Process wastewater is treated in skimming tanks prior to discharge to the Lake George Branch, Indiana Harbor Canal. Skimmings are chemically and thermally treated for oil recovery. Sludges from these facilities are burned. About $15,000 has been expended by the Company for wastewater treatment facilities.

Sinclair Refining Company, East Chicago: Sinclair is the second largest petroleum refinery in Indiana. The company purchases potable water from East Chicago and pumps process water from Lake Michigan. In 1947, all plant sanitary sewers were connected to the East Chicago Sanitary District sewerage system. Treated process wastewater and recirculating process water cooling tower blowdown is discharged to the Lake George Branch, Indiana Harbor Canal.

In 1946, two A.P.I. oil separators were built to replace one of two oil separators built prior to 1933. Cooling towers are utilized on the process waters. In-plant recirculation of water is 250 million gallons per day and treated wastewater discharge is 5 million gallons per day. Considerable refinery equipment modification in the late 1940's and early 1950's reduced the amount of wastewater requiring treatment.

An ammonia and sulfide stripper is utilized in the treatment of sour water. Stripper bottoms and cooling tower blowdown are discharged to the crude oil desalter for additional phenol extraction.

Boiler blowdown and hot lime sludge is discharged to a separator for treatment. Caustics containing phenols are sold for by-product recovery. Spent caustics containing sulfides and mercaptans are oxidized. Spent sulfuric acid is returned to the supplier for reprocessing.

New ballast water A.P.I. oil separators were constructed in 1963. About $3,930,000 has been expended by the Company for water pollution control facilities.

U. S. Gypsum Company, East Chicago: The plant produces plaster, wallboard and asbestos-cement shingles. All sewage is discharged to the East Chicago

Sanitary District sewerage system. Process wastewaters, .4 million gallons per day, are discharged to the Indiana Harbor Canal.

Youngstown Sheet and Tube Company, Indiana Harbor Works, East Chicago: The company pumps process water, 288 million gallons per day, from Lake Michigan and discharges treated and untreated process wastewaters to the Indiana Harbor Canal and Lake Michigan. All sewage, except for isolated septic tank-absorption field systems, is discharged to the East Chicago Sanitary District sewerage system.

Dephenolizers were installed in the coke plant for wastewater treatment. Coke quenching wastes are discharged to a settling basin with partial recirculation. Tar decanter waters are discharged to the dephenolizer. Benzol condensates are double decanted prior to discharge to the canal. Scale pits are provided at all rolling mills and secondary pits are baffled to trap free oil.

Wastewater discharged to Lake Michigan passes through an oil removal basin which is equipped with a continuous oil removal belt. A portion of the waste pickle liquor is trucked to the slag dump for disposal and some is discharged to the canal.

In-plant controls, in compliance with Regulation SPC-2, to isolate concentrated cyanide solutions were installed in 1956. A gravity oil separator for a six-stand tandem mill in the No. 2 tin mill was approved by the Board and installed in 1961.

Halogen tinning line plating solution is trucked to the slag dump for disposal.

The wastewater treatment facilities for a new No. 3 cold reduced sheet mill now under construction were approved by the Board on October 23, 1964. These facilities consist of gravity oil separators and a terminal lagoon. The lagoon effluent will seep horizontally through 250 feet of slag before reaching Lake Michigan. Cooling waters containing less than 10 milligrams per liter of oil will be discharged directly to Lake Michigan.

Flue dust thickeners and sludge dewatering equipment are installed for the blast furnace gas washer system. About $5,000,000 has been expended by the Company for water pollution control facilities.

Inland Steel Company, East Chicago: The Company pumps process water, 800 million gallons a day, from Lake Michigan and discharges treated and untreated process wastewaters to the Indiana Harbor Canal and Lake Michigan. All plant sewage is treated in two Company owned and operated trickling filter treatment plants. A third plant is proposed. All sewage plant effluents are chlorinated prior to discharge to either the canal or lake.

In 1928, the Company installed facilities for recirculation of coke plant gas final cooling waters for phenol reduction. About 1930, a Koppers vapor recirculation phenol recovery unit was installed for ammonia still wastes.

Blast furnace flue dust thickeners and vacuum dewatering facilities for thickener sludges were installed about 1931. Additional phenol recovery by light oil extraction; a settling basin for coke quenching wastes and ammonia still wastes; recirculation of coke plant tar decanter wastes; 13 scale pits; oil recovery and treatment facilities on the slab mill, 44-inch hot mill, 46-inch tandem cold mill, 40-inch tandem mill and the three-stand skinny tin line has also been provided.

Fly ash and bottom ash lagoons for the new power plant have been constructed. Facilities under construction consist of: Scale pits for new blooming and billet mills, scale pits, oil skimming pits, some chemical flocculator-clarifiers, and a tunnel to divert wastewaters to the Indiana Harbor Canal for a new 80-inch hot strip mill. The wastewater treatment proposal for the 80-inch hot strip mill was submitted to the Public Health Service for comment. It was requested the Public Health Service inform the Board as to the compatibility of the proposal with the long-range planning of the GLIRB project. The Public Health Service did not express an opinion on the proposal. The new oxygen steelmaking facilities will have a closed stack gas washer system.

About $19,100,000 has been expended by the Company for water pollution control facilities.

National Tube Division, United States Steel Corporation, Gary: In 1949, all plant sewage was diverted to the Gary Sanitary District sewerage system. Approximately 10 million gallons per day of process waters is obtained from the Gary Steel Works. Process wastewaters are discharged to the Grand Calumet River. About $800,000 has been expended for separation of sewers and installation of facilities to convey sewage to the Gary-Sanitary District.

Gary Steel Works, United States Steel Corporation, Gary: The Company pumps process water, 577 million gallons per day, from Lake Michigan and discharges treated and untreated wastewaters to the Grand Calumet River. Some cooling waters are discharged to Lake Michigan. All plant sewage is discharged to the Gary Sanitary District.

Ammonia still liquors are used for quenching coke. Coke quenching wastewater is recirculated.

Benzol condensates are discharged to the river.

Flue dust thickeners are installed for partial recovery on the blast furnace gas washer system.

In 1950 and 1951, an experiment on the treatability of ammonia still liquors at the Gary Sanitary District sewage treatment plant was conducted. The experiment was a success but the City and industry did not reach agreement to continue the project. About $11,000,000 has been expended by the Company for water pollution control facilities.

Gary Sheet and Tin Mill Division, United States Steel Corporation, Gary: The Company pumps process water, 60 million gallons per day, from Lake Michigan and discharges treated and untreated wastewaters to the Grand Calumet River. Some cooling water and storm water from combined process wastewater sewers is discharged to Lake Michigan. All plant sewage is discharged to the Gary Sanitary District.

Waste pickle liquors are discharged to a lagoon and seepage therefrom drains to Lake Michigan. The lagoon will be eliminated by the use of a deep well disposal system which is under construction. Waste pickle liquors and tinning line chromium solutions will be discharged to the deep well system. A lagoon for neutralized nitric and hydrofluoric acids from the stainless steel line will be constructed in 1965.

Waste treatment facilities consisting of gravity oil separators with an emergency bypass to Lake Michigan were approved by the Board in 1964 for a new 80-inch, five-stand sheet mill. These facilities have been completed and are in operation. The separator effluent is discharged to the river. About $3,600,000 has been spent by the Company for water pollution control facilities.

American Bridge Division, United States Steel Corporation, Gary: In 1945, all plant sewage was diverted to the Gary Sanitary District sewerage system. Currently, only rivet machine cooling water is discharged to the Grand Calumet River. About $1,000,000 has been expended for water pollution control facilities.

Steiner Tissue Mill, Gary: Potable water, .1 million gallons per day, is purchased from the Gary-Hobart Water Company. Process waters, 1.4 million gallons per day, are pumped from the Grand Calumet River to a clarification pond prior to use in the plant. Process wastewaters are treated in two fiber save-all units prior to discharge to the Grand Calumet River. All sewage is discharged to the Gary Sanitary District.

Berry Refining Company, Gary: All process and potable water is purchased from the Gary-Hobart Water

Company. All sewage is disposed in septic tank-absorption field systems. Process wastewaters are treated in an A.P.I. oil separator and impounding basin.

The effluent from the impounding basins is discharged to a swampy area on Cities Service Oil Company property. No wastewaters are discharged to a surface stream, surface waters, or lake. About $15,000 has been expended for water pollution control facilities.

Northern Indiana Public Service Company, Bailly Generating Station, Baileytown: The Bailly Generating Station started operation in 1962. Initial capacity was 175,000 kilowatts. Maximum process water requirement is about 425 million gallons per day and the water is pumped from Lake Michigan. Sewage is disposed in septic tank-absorption field systems. Bottom ash, fly ash and cinders are sluiced to a solids storage area. Sluicing waters and coal storage drainage are absorbed into the ground. Approximately $70,000 has been expended by the Company for pollution control facilities.

Universal Atlas Cement Company, United States Steel Corporation, Gary: Process water is pumped from Lake Michigan. Pump capacity is 72 million gallons per day. All plant sewage is treated in a fixed-nozzle trickling filter plant. The sewage plant was built in 1926. The sewage plant effluent is discharged to Lake Michigan. During a recent inspection, fish were observed to be living in the final clarifiers. No process wastewaters other than indirect cooling waters are discharged to the lake. About $200,000 has been expended for water pollution control facilities.

Northern Indiana Public Service Company, Dean H. Mitchell Station, Gary: The plant pumps process water, 433 million gallons per day, from Lake Michigan. Process wastewater is discharged to Lake Michigan. Sewage is treated in septic tanks. The septic tank effluent is discharged to Lake Michigan. The raw process waters are chlorinated. About $82,000 has been expended by the Company for water pollution control facilities.

Union Carbide Corporation, Chemicals Division, Whiting: Process water is pumped from Lake Michigan. Process wastewaters are discharged to Lake Michigan and the Indiana Harbor Canal. All plant sewage is discharged to the Whiting sewerage system. Cooling towers are utilized for partial reuse of product contaminated cooling waters.

In 1934, the Company initiated a program to separate sewage from other wastewaters for discharge to a municipal sewerage system. The program was completed in 1947 when all sewage was discharged to the Whiting sewerage system. During the 1935 to 1960 period, the Company installed the following facilities: Wastewater clarification basin, raw water chlorination unit, closed cooling water system for direct product-contact cooling waters, and a cooling tower system, and established an effluent monitoring program. During the 1960 to 1965 period, the following facilities were added: Retention basin, automatic effluent sampler, skimming pit, collection tank for land disposal of concentrated wastes, plus many other minor pollution control facilities. Approximately $950,000 was expended by the Company for pollution control facilities during the 1935 to 1965 period.

Future plans indicate that the following pollution control units will be installed in 1965 at an estimated cost of $46,100: Closed water system dissolved solids removal unit, improved oil recovery facilities, screens and recovery facilities for polyethylene pellets, and wastewater laboratory equipment.

American Oil Company, Whiting: The Company is the largest petroleum refinery in Indiana. Process water is pumped from Lake Michigan and discharged to Lake Michigan after treatment.

Potable waters are obtained from Whiting. All sewage, except from a few isolated buildings is discharged to the Whiting sewerage system. Isolated buildings are served by septic tank-absorption field systems. Process wastewaters are conveyed to treatment facilities via two separate sewer systems. Wastewaters containing settleables and floatables are discharged to mechanically equipped A.P.I. oil separators and thence to Lake Michigan.

Wastewaters containing settleables, and floatables, dissolved organics and dissolved inorganics are discharged to mechanically equipped A.P.I. oil separators and thence to bio-flotation facilities.

The bio-flotation facilities consist of aeration and settling units. The effluent from the bio-flotation facilities are discharged to Lake Michigan.

Spent caustics containing sulfides and phenols are trucked to lagoons located northwest of the Lake George Branch, Indiana Harbor Canal. Cooling towers are utilized for partial reuse of cooling waters. Spent sulfuric acids are returned to the supplier for reprocessing. Separation tanks and an oil separator are utilized for ballast water in Indiana Harbor Canal docks.

Cooling towers have been installed for recirculation of 100 million gallons per day of cooling waters. Water usage peaked in 1946 at about 200 million gallons per day. Water usage has been gradually decreased to about 140 million gallons per day in 1964. The oil separators utilized on wastewaters containing settleables and floatables were built in 1940. The oil separators preceding bio-flotation were constructed in 1948.

The bio-flotation facilities were placed in operation in 1960.

Facilities for conveying plant sewage to the Whiting sewerage system were completed in 1948. Approximately $9,055,000 has been expended for pollution control facilities at the refinery.

American Maize Products Company, Hammond: The company located in Hammond in 1905 and is a corn processing plant. Potable water, .7 million gallons per day, is purchased from Hammond. Process water, 11 million gallons per day, is pumped from Lake Michigan. All sewage, except from one warehouse toilet, and a small amount of concentrated process wastewater is discharged to the Hammond Sanitary District.

The warehouse toilet is sewered to the process wastewater lagoon system. Treated process wastewaters are discharged to Lake Michigan. Treatment consists of anaerobic-aerobic lagoons. Many in-plant controls of wastewater have been provided as well as an in-plant wastewater monitoring system.

Prior to 1940, all wastewaters were discharged to Lake Michigan without treatment. In 1940, all sewage and some process wastewater was diverted to Hammond. Considerable in-plant equipment changes were made in 1949 and 1950 in order to reduce waste loadings to Lake Michigan. Raw water supply chlorination was instituted in 1950. Sufficient chlorine was applied to the raw water to maintain a chlorine residual in the effluent to Lake Michigan. Later, chlorine was also applied directly to the wastewater discharged to Lake Michigan.

During the late 1950's and early 1960's, the Company developed an anaerobic-aerobic lagoon system for treatment of wastewater prior to discharge to Lake Michigan. An experimental column trickling filter has been installed for continuing studies on the treatability of process wastewaters.

The ultimate objective of the Company is to produce a plant effluent of .5 population equivalent per bushel of corn processed. Approximately $1,340,000 has been expended by the Company for water pollution control facilities.

Commonwealth Edison Company, Inc., State-line Generating Station, Hammond: The plant purchases potable water, .1 million gallons per day, from Hammond and pumps process water, one thousand and seven million gallons per day, from Lake Michigan. Process waters are chlorinated prior to use. A sewerage system was installed in 1920 for collection of sewage for discharge to the Metropolitan Sanitary District of Chicago.

In 1949, an Imhoff tank with effluent chlorination was installed. The chlorinated effluent discharged to Lake Michigan until the Metropolitan Sanitary District connection became available in 1961. An ash disposal basin was constructed in 1946. The basin was later replaced in 1961 with bottom ash dewatering tanks. Fly ash is handled dry. Approximately $460,000 has been expended by the Company for water pollution control facilities.

Little Calumet River-Burns Ditch: The Little Calumet River-Burns Ditch drainage basin includes the major land area of the Calumet Basin. Burns Ditch is a man-made drainage canal constructed in 1923 discharging to Lake Michigan. This ditch reversed the flow to the east in the Little Calumet River at about Broadway Street in Gary. The basin receives the treated effluent from the Chesterton, Crown Point, East Gary, Hobart, and Valparaiso sewage treatment plants.

The sewage from Porter is not yet treated, but the Town is under Board order. Portage, New Chicago, Ogden Dunes and St. John do not have sewer systems.

The sewage treatment plants serving Chesterton, Hobart and Valparaiso provide adequate capacity, are well maintained and operated, and produce a good quality effluent. Improvements planned for construction at Crown Point this year will provide adequate capacity, good operation and maintenance will continue. Effluent chlorination is provided for all these plants.

The adequacy of the Gary-Miller District plant that is now serving East Gary is problematical. Plant additions, including effluent chlorination facilities, and improved operation and maintenance is required.

The start of construction of sewage works for Porter is scheduled for July 1, 1965.

Treated waste effluents from Midwest Steel and Bethlehem Steel plants discharge to Burns Ditch and the Little Calumet River, respectively. The effluent from Northern Indiana Public Service Company discharges to Lake Michigan.

There is no interstate pollution from the Little Calumet River-Burns Ditch drainage basin.

CHAIRMAN STEIN: Mr. Miller, if we are going to continue, let me call these two gentlemen first.

Mr. H. R. McDonald, of Lever Brothers, and Mr. Keiper, of Mobil Oil?

Go ahead.

MR. MILLER: Crown Point: The City of Crown Point is served by sanitary and combined sewers. The 1960 population was 8,433; the plant was designed for a population of 7,500 and a flow of .8 million gallons per day.

The existing activated sludge-type sewage treatment facilities, including effluent chlorination provide treatment for most of the present population. The plant provides approximately 85 percent reduction in terms of 5-day B.O.D.

The plant is fairly well operated and maintained. Approved plans for plant additions, including expanded chlorination facilities, will extend the capacity to 1.8 million gallons per day. The plant effluent and stormwater overflow from combined sewers discharge to Bee Line Ditch, a tributary to Keep River and Burns Ditch.

Hobart: The City of Hobart is served by a system of sanitary and combined sewers, and an activated sludge-type sewage treatment plant including effluent chlorination facilities were placed into operation. The 1960 population was 18,680; the plant is designed for a population of 23,000 and a flow of two million gallons per day.

Primary treatment facilities were placed in operation in 1953 and secondary facilities were completed in 1962. The plant provides approximately 90 percent reduction in terms of 5-day B.O.D. The facilities are well maintained and operated.

The effluent discharges to Deep River thence to Burns Ditch. Stormwater overflow from combined sewers discharge to Deep River and tributaries thereto.

On September 29, 1948, the Board issued a pollution abatement order to the City of Hobart. The City filed a petition to set the order aside. The case was finally heard on February 2, 1950, in Jasper Circuit Court. The court issued a decision upholding the Board's order.

East Gary: The City of East Gary is served by combined and sanitary sewers. And wastes from this community are discharged to the Gary-Miller sewage treatment plant.

The Gary-Miller trickling filter-type sewage treatment plant is designed to treat approximately 1.5 million gallons per day. Effluent chlorination is not provided; the plant provides approximately 70 percent reduction in terms of 5--day B.O.D. Plant effluent and stormwater overflow from combined sewers discharge to Burns Ditch.

On April 3, 1958, the City of East Gary signed an agreement with the Gary Sanitary District for treatment of East Gary sewage at the Gary-Miller District plant.

On January 13, 1959, the Board approved plans for interceptor sewers, connection to the Miller District plant and improvements to the Miller District plant.

It has approximately 40,000 feet of combined sewers; since 1960, approximately 37,500 feet of sanitary sewers have been installed.

In 1962, the City of East Gary was advised that effluent chlorination would be required. At that time, the Gary Sanitary District was planning a lift station and interceptor to divert the Gary sewage then discharged to the Miller plant to the Sanitary District's main plant, and it was indicated that East Gary would acquire the Miller plant.

The Gary sewage from this area is now discharged to the Gary Sanitary District's main plant.

On October 9, 1964, the State Board of Health advised East Gary that the Miller District plant was in poor condition and that laboratory and chlorination facilities were required. This last report from East

Gary indicated that an earlier decision would be made on whether to acquire the Miller plant or effect an agreement for treatment of its sewage by the Gary Sanitary District.

New Chicago: The Town of New Chicago is not served by a sewer system. The soil is predominantly sandy and individual sewage effluents are apparently absorbed into the ground.

In May, 1949, a preliminary report on a proposed water and sewer system was submitted. A public water supply has been installed. However, no progress has been made towards providing sewage works. An engineering survey was proposed in 1962; further information has not been received.

Chesterton: The Town of Chesterton is served by a combined sewer system and an activated sludge-type sewage treatment plant with effluent chlorination facilities. The 1960 population was 4,192; the plant is designed for a population of 10,000 and a flow of one and a half million gallons per day.

The plant provides approximately 90 percent reduction in terms of 5-day B.O.D.; the facilities are well maintained and operated.

The effluent discharges to the Little Calumet River. Stormwater overflow from combined sewers discharge to the Little Calumet River and tributaries thereto.

Valparaiso: The City of Valparaiso is served by a combined sewer system and an activated sludge-type sewage treatment plant. Effluent chlorination is provided. The 1960 population is 15,227; the plant is designed for a population of 20,000 and a flow of 2.0 million gallons per day.

The plant provides approximately 95 percent reduction in terms of 5-day B.O.D.; and the facilities are well maintained and operated.

The effluent discharges to Salt Creek, thence to the Little Calumet River and Burns Ditch. Stormwater overflow from combined sewers discharges to Salt Creek and tributaries thereto.

A letter from the Board dated June 4, 1964, requested continuous chlorination of plant effluent and a chlorine residual of one milligram per liter. On June 9, 1964, the mayor advised that the City would comply with the Board's request.

On January 5, 1965, the Board approved additions to chlorination facilities and recommended that the City authorize a study of sewer and sewage treatment plant improvement needs and that construction of facilities be undertaken to keep pace with community development.

Portage: The Town of Portage was incorporated in 1959. The area of 27 square miles had a 1960 population of 11,822. The Gary-Hobart Water Corporation is providing water to the area. A drainage project, to be partially financed by a $100,000 loan from the Indiana Flood Control Revolving Fund, is now under consideration. No municipal sewers are available.

The preliminary engineering report on sanitary sewers and sewage treatment, which was submitted January 25, 1962, proposed the installation of approximately 263,000 feet of sanitary sewers and a 1.25 million gallon per day activated sludge-type sewage treatment plant to serve a population of 12,500. No progress has been made towards construction of sewage works.

The Portage Junior-Senior High School and Capitol Estates and Robbinwood Subdivisions, that are located within the corporate limits of Portage, provide activated sludge-type sewage treatment facilities with effluent chlorination. Robbinwood has chlorination facilities approved. The effluent from these plants discharges to Salt Creek and tributaries to the Little Calumet River.

Porter: The Town of Porter is served by separate and combined sewers. The Town sewers discharge to the Little Calumet River. Sewage from 15 homes adjacent to the Chesterton sewage treatment plant is treated at that plant.

On October 8, 1964, the Board ordered the Town of Porter to abate its contribution to the pollution of the Little Calumet River. Plans and specifications are due March 1, 1965; construction is to be started by July 1, 1965, and the facilities are to be completed by July 1, 1966.

Midwest Steel Company Division, National Steel Corporation, Portage: The Company pumps water from Lake Michigan and has a maximum pumping capacity of 52 million gallons per day. Treated wastewaters are discharged to Burns Ditch. The plant started production in 1961.

One of the outstanding industrial waste treatment plants in the country was provided as a part of original plant construction. These three separate sewer systems for conveying sewage, process wastewaters and cooling waters are utilized. All sewage receives activated sludge treatment with effluent chlorination prior to discharge to Burns Ditch. Treatment of process wastewaters consists of acid-alkali neutralization, oil emulsion breaking with coagulation and clarification, and mechanically-equipped basins for removal of settleables and floatables.

Concentrated chromium and fluoride-bearing wastes are treated separately. A deep well disposal system was constructed in 1964 for underground disposal of waste pickle liquor and spent chromium-bearing solutions.

The plant effluent is routinely monitored by automatic samplers and laboratory analyses. In-plant controls, in compliance with Regulation SPC-2, to isolate concentrated Cyanide Solution tanks have been installed in the tin mill. The Board's 1961 approval of the process wastewater system was based on the final effluent meeting the following standards:

B.O.D., 10 milligrams per liter; fluoride, 10 milligrams per liter.

MR. POOLE: Two.

MR. MILLER: Pardon me, two.

Zinc, 15; chromium, 2; cyanides, .5; pH between 5 to 10; suspended solids, 40 milligrams per liter; floating material, no objectionables; color, no objectionable; oils, 15 milligrams per liter.

The effluent from the treatment facilities is consistently better than the standards approved by the Board.

No impairment of Burns Ditch or Lake

Michigan has occurred as a result of the company's wastewater. The operation of the wastewater treatment facilities has been without exception excellent. About $6,025,000 has been expended for water pollution control facilities. It is expected that, when the company installs basic steel and coking production units, equally extensive wastewater treatment will be provided.

Midwest Steel Company is an example of a new industry that has provided adequate water pollution control facilities to comply with the requirements of the Board.

Bethlehem Steel Company, Inc., Burns Harbor Plant, Chesterton: The construction of the Burns Harbor plant is the most recent major industrial development in Indiana. Initial production began in 1964 and additional production facilities are under construction. Water is pumped from Lake Michigan. Treated wastewaters are discharged to the Little Calumet River, thence to Burns Ditch.

Separate sewers for conveying sewage, process wastewaters and cooling waters are, or will be, installed; all sewage receives activated sludge treatment and the effluent is chlorinated. The chlorinated effluent is discharged to a terminal lagoon for tertiary treatment. Treatment of process wastewaters consists of acid-alkali neutralization, emulsion breaking with coagulation and clarification, and mechanically equipped basins for removal of settleables and floatables.

Concentrated chromium--and fluoride-bearing wastes will be treated separately. A deep well disposal system for underground injection of waste pickle liquor is under construction.

An 80-acre terminal lagoon system has been constructed for tertiary treatment of all wastewater other than cooling water. Final settling, reaeration and cooling will occur in the terminal lagoon. The lagoon spillway has been constructed so that additional aeration or reaeration will occur. Facilities for removing floatables from the lagoon have been installed.

The plant effluent will be routinely monitored by automatic samplers and laboratory analyses. In-plant controls, in compliance with Regulation SPC-2 to isolate concentrated cyanide solutions will be installed in the tin mill. The Board's approval of the process wastewater system was based on the final effluent meeting the following standards:

pH between 5 to 10; suspended solids, 40 milligrams per liter; oils, 15; B.O.D., 10; cyanides, .2; chromium, 1; fluoride, 1.5; and there will be no objectionable floating material or color.

It is anticipated that the effluent will be of better quality than that approved by the Board.

About $7,000,000 has been expended for water pollution control facilities. It is expected that, when the Company installs basic steel and coking production units, equally extensive wastewater treatment will be provided.

Bethlehem Steel Company, Inc., is another example of a new industry that has provided adequate water pollution control facilities to comply with requirements of the Board.

Semi-Public: There are two semi-public sewage treatment plants in this drainage basin. Most of the subdivisions are served by package activated sludge sewage treatment plants. Operation and maintenance of many of the facilities is inadequate. The owners have been advised of the requirement for providing continuous effluent chlorination; however, in some instances, chlorination facilities are not available or, if available, not effectively operated.

Plans have been approved for effluent chlorination facilities for the Lake County Home, north of Crown Point, and the Robbinwood Subdivision in Porter County.

The public schools in the area that have private sewage disposal facilities do not routinely provide adequate operation and maintenance. The two Indiana Toll Road treatment plants in the area are well maintained and operated.

At least five of the semi-public sewage treatment plants in and near the Merrillville Conservancy District will be abandoned when the District sewers now under construction are available.

These include three Merrillville schools, a bowling alley, and Chapel Manor Subdivision.

The Little Calumet River-West: The Little Calumet River Basin is divided into two drainage areas by Broadway Street in Gary. That area east of Broadway discharges to Lake Michigan through Burns Ditch. West of Broadway, the water flows into the Calumet-Sag Canal entering Illinois approximately 300 yards west of Hohman Avenue in Hammond.

The Little Calumet River receives sewage from Dyer and Schererville, a portion of the sewage from Griffith and Highland, and treated waste from Simmons Company.

A U. S. Geological Survey recording gage on the Little Calumet River near the state line shows a minimum daily discharge of 1.9 cfs and a mean daily discharge of 7.3 cfs for August 1964. Water quality monitoring data shows the stream to be polluted.

The sewerage project recently completed by the Hammond Sanitary District, completion of the sanitary sewage connection to Hammond by Griffith and Highland, and completion of the sewage works projects under construction by Dyer and Schererville will return the Little Calumet River flowing into Illinois to a satisfactory condition.

Stormwater pumping facilities in Griffith, Highland, Munster, and Gary and stormwater overflow from combined sewers will continue to impose a bacteria and organic load on the Little Calumet River and tributaries thereto.

Dyer: The Town of Dyer is served by sanitary and combined sewers. The project now under construction will provide interceptor sewers and an activated sludge type sewage treatment facility, including effluent chlorination, for a design population of 6,000 and a flow of .6 million gallons per day. The effluent from the plant and stormwater overflows will discharge to Hart Ditch, a tributary to the Little Calumet River.

The Board issued a pollution abatement order to the Town of Dyer on July 20, 1960; as constructive progress was not achieved, the case was referred to the Attorney General on July 18, 1961. Court action was deferred when the Town agreed to proceed with preparation of final plans.

Griffith: The Town of Griffith is served by a combined sewer system. The dry weather sewage flow is pumped to the Hammond Sanitary District interceptor for treatment; stormwater overflows from combined sewers are discharged to Cady Marsh Ditch and to the Little Calumet River.

Highland: The Town of Highland is served by separate and combined sewers. The dry weather sewage flow from approximately 50 percent of the population is pumped to the Hammond Sanitary District for treatment. Sewage and wastes from the remainder of the community, which are now discharged to Hart Ditch and the Little Calumet River, will be connected to Hammond Sanitary District interceptors by the project now under construction. Stormwater overflows will continue to discharge to Hart Ditch and the Little Calumet River.

Munster: The Town of Munster is served by sanitary and combined sewers; and the dry weather sewage and waste flow is treated at the Hammond Sanitary District treatment plant. The Town of Munster was made a part of the District on January 26, 1948. The stormwater overflow from combined sewers discharges to Hart Ditch and the Little Calumet River.

On August 26, 1948, plans were approved for interception of existing sewers and connection to Hammond interceptors; however, financing of the project was delayed and actual connection was not made until December, 1953.

Local developers continued to construct combined sewers with outfalls to the Little Calumet River; therefore, additional pollution was created.

As provisions were not undertaken for correction, the Board issued an order to the Hammond Sanitary District on September 21, 1961. On September 27, 1961, a petition for a court review of the order was filed by the Hammond Sanitary District. However, the petition was dismissed in 1962 and the District proceeded with plans for the construction of additional interceptor sewers. The project, which was financed by $592,000 in Sanitary District bonds and a $243,000 Federal grant, was completed early in 1964.

Schererville: The Town of Schererville is primarily served by sanitary sewers. The project now under construction provides for the installation of approximately 75,000 feet of sanitary sewers and an activated sludge type sewage treatment facility, including effluent chlorination, to serve a design population of 6,000 and deferred when the Town agreed to proceed with preparation of final plans.

Griffith: The Town of Griffith is served by a combined sewer system. The dry weather sewage flow is pumped to the Hammond Sanitary District interceptor for treatment; stormwater overflows from combined sewers are discharged to Cady Marsh Ditch and to the Little Calumet River.

Highland: The Town of Highland is served by separate and combined sewers. The dry weather sewage flow from approximately 50 percent of the population is pumped to the Hammond Sanitary District for treatment. Sewage and wastes from the remainder of the community, which are now discharged to Hart Ditch and the Little Calumet River, will be connected to Hammond Sanitary District interceptors by the project now under construction. Stormwater overflows will continue to discharge to Hart Ditch and the Little Calumet River.

Munster: The Town of Munster is served by sanitary and combined sewers; and the dry weather sewage and waste flow is treated at the Hammond Sanitary District treatment plant. The Town of Munster was made a part of the District on January 26, 1948. The stormwater overflow from combined sewers discharges to Hart Ditch and the Little Calumet River.

On August 26, 1948, plans were approved for interception of existing sewers and connection to Hammond interceptors; however, financing of the project was delayed and actual connection was not made until December, 1953.

Local developers continued to construct combined sewers with outfalls to the Little Calumet River; therefore, additional pollution was created.

As provisions were not undertaken for correction, the Board issued an order to the Hammond Sanitary District on September 21, 1961. On September 27, 1961, a petition for a court review of the order was filed by the Hammond Sanitary District. However, the petition was dismissed in 1962 and the District proceeded with plans for the construction of additional interceptor sewers. The project, which was financed by $592,000 in Sanitary District bonds and a $243,000 Federal grant, was completed early in 1964.

Schererville: The Town of Schererville is primarily served by sanitary sewers. The project now under construction provides for the installation of approximately 75,000 feet of sanitary sewers and an activated sludge type sewage treatment facility, including effluent chlorination, to serve a design population of 6,000 and a flow of .86 million gallons per day. The effluent from the plant will discharge to a tributary to Hart Ditch, thence to the Little Calumet River.

Simmons Company, Munster: Process and potable water is purchased from Hammond. Approximate water usage is .3 million gallons per day. All sewage is discharged to the Hammond Sanitary District sewerage system. Treated process wastewaters are discharged to the Little Calumet River.

Cyanide control facilities, in compliance with Regulation SPC-2, are provided within the plant. Process wastewaters are chemically treated to oxidize cyanides and reduce chromiums. Basins are provided to remove settleables including metal precipitates and floatables.

Two-stage continuous alkaline-chlorination is provided for cyanide-bearing wastewaters. Sodium metabisulfite reduction plus lime neutralization is provided for chromium-bearing rinse waters. The discharge of treated process wastewaters to the river was approved by the Board in 1959. The approval was based upon the contaminants in the effluent not exceeding the following concentrations:

Cyanide, 0; chromium, .5. These are milligrams per liter. Oil, 5; settleable solids, none;

pH between 6.5 to 8.5.

The Company has, in general, been meeting the effluent quality specified by the Board. Approximately $65,000 has been expended by the Company for pollution control facilities.

Semi-Public: The Dyer Elementary School and the Mount Merch Sanatorium in Dyer will be connected to the Dyer municipal sewer system. The sewage treatment facilities serving the Wilbur Wright School in Munster will be abandoned and connection made to a Hammond Sanitary District sewer.

St. Mary's in Schererville disposes of its sanitary sewage, after activated sludge treatment and chlorination, on its own grounds; however, if difficulty is experienced, connection could be made to the Schererville sewer system.

Consideration is being given to connection of the St. John's Township schools, which are in the Burns Ditch drainage basin, to the Schererville sewer system.

With the completion of municipal sewer systems now under construction, it appears that all significant sources of sanitary wastes from semi-public installations in this drainage basin could feasibly be connected to municipal sewers.

The Grand Calumet River-West: The Grand Calumet River enters Illinois approximately 700 yards west of Hohman Avenue, Hammond. The divide in the river is approximately at Indianapolis Boulevard in Hammond although both easterly and westerly flows have been observed at this location.

Generally, any discharges to the river west of the boulevard flow into Illinois and discharges east of the boulevard enter Lake Michigan by way of the Indiana Harbor Canal. There are no stream gauging stations on the Grand Calumet River in Indiana.

Most of the flow at the state line consists of Hammond Sanitary District sewage treatment plant effluent. Some industrial wastes are also present.

Water quality monitoring data show the stream to be polluted. The higher B.O.D.'s and coliform counts noted in 1963 and 1964 were caused by the bypassing of all or portions of the plant units during construction of improvements at the Hammond plant.

When effluent chlorination facilities are installed, the bacterial quality of the Grand Calumet River flowing into Illinois will be improved. However, it should be pointed out that during periods of storms, stormwater overflow from combined sewers will impair bacterial quality and contribute some organic load to the stream.

Hammond: The Hammond Sanitary District provides interceptor sewers and sewage treatment for the City of Hammond and the Town of Munster within District boundaries and sewage treatment by contract for the Towns of Griffith and Highland and the City of Whiting.

The 1960 tributary population of 155,915 is served by an activated sludge plant with a design population equivalent of 490,000 and a design flow of 36 million gallons per day.

The plant provides approximately 95 percent reduction in terms of 5-day B.O.D.; in general, the operation and maintenance of the facilities is adequate.

However, bypassing of all or portions of the sewage works, including pump stations and interceptors, during recent improvement projects contributed materially to the high coliform bacteria counts and organic loads noted in the Grand and Little Calumet Rivers.

The majority of the area is served by combined sewers; as early as 1930, it was reported that Hammond had 155 miles of combined sewers.

However, separate stormwater systems serve an area with stormwater discharge to Wolf Lake and Lake Michigan. The Robertsdale pumping station discharges stormwater overflow from combined sewers to Lake Michigan.

The activated sludge type sewage treatment facilities are located adjacent to Columbia Avenue and effluent is discharged to the Grand Calumet River. Under normal flow conditions, the flow is west to Illinois. Chlorination facilities are not provided; the Board has advised that chlorination of the effluent is required.

On September 2, 1964, a report on chlorination facilities was considered satisfactory by the Board and the District was required to advise of action planned to install said facilities. The District has not submitted a timetable for construction of chlorination facilities.

Whiting: The City of Whiting is served by a combined sewer system with provisions for discharge of dry weather sewage flow to the Hammond Sanitary District for treatment. A sewer outfall to Lake Michigan at Front Street and a stormwater pumping station at Atcheson Avenue discharges, at times, sewage and stormwater overflow to Lake Michigan.

On April 25 the Board approved plans for connection to approximately two-thirds of Whiting's sewage to the District.

On October 1, 1946, Whiting filed a stipulation with the U. S. Supreme Court agreeing either to construct a plant or connect all its sanitary sewage to the Hammond Sanitary District within two years. The stipulation pointed out that two-thirds of Whiting's sewage was discharged to Hammond.

On October 24, 1947, the Board approved plans for connection of the remainder of the sewage to Hammond; however, the work was not completed until December 5, 1949. Operation of the Front Street station was not satisfactory. On May 31, 1951, the Board approved plans for improvements.

Intermittent discharge of raw sewage to Lake Michigan continued. A stipulation, in lieu of an order, was entered into by the Board and Whiting on February 9, 1954. The City stipulated that necessary improvements to abate sewage discharge to Lake Michigan would be constructed.

In 1954, a flood gate was installed on the Front Street outfall to keep lake water from entering the sanitary sewage pump station which was designed to discharge sewage to Hammond. The operation of the sanitary sewage pump station has not been satisfactory as raw sewage is still intermittently discharged to Lake Michigan.

Adolph Plating, Inc., East Chicago: The East Chicago plant of Adolph Plating Company is currently under construction. Plant operations will begin in

1965, and all plant sewage will be discharged to the East Chicago Sanitary District sewerage system.

Untreated process wastewaters, .3 million gallons per day, will be discharged to the Grand Calumet River. The project was approved by the Board on January 5, 1965, with the understanding that when water quality criteria for the river are established, the necessary waste treatment will be provided. In-plant cyanide control facilities, in compliance with Regulation SPC-2, will be provided.

LaSalle Steel Company, Hammond: All plant sewage is discharged to the Hammond Sanitary District sewerage system. Process wastes consist of 16,000 gallons per week of waste pickle liquor and pickling rinse waters. Waste pickle liquor is discharged twice a week to a mixing basin where a wire coating lime-dip solution is added for neutralization. Routine rinse waters are also discharged to the mixing basin. The neutralized wastes are discharged to the Grand Calumet River.

Estimated Company expenditure for water pollution control facilities is $16,000.

Federal Cement Tile Company, Hammond: The Federal Cement Tile Company is served by a 7,500 gallons per day activated sludge type sewage treatment plant with effluent discharge to the Grand Calumet River near the Indiana-Illinois state line. It is the only semi-public sewage treatment facility in this sub-basin. The Company has been advised of the need for chlorination facilities.

The Wolf Lake Basin: Wolf Lake is a natural lake located on the Indiana-Illinois state line which, in the past, drained into Lake Michigan. This outlet is now blocked and the lake discharges to the Calumet River in Illinois. There is very little outflow from the lake. The lake receives the effluent from Lever Brothers waste treatment facilities via Wolf Lake channel. This channel begins at the Lever outfall. The Board initiated enforcement actions against Lever Brothers and accepted a stipulation in 1947. After that date, complaints were received that fish kills occurred. In 1962, a hearing was held. As a result of this hearing, the Company has retained an engineer and studies are being conducted to determine necessary improvements.

The water quality of Wolf Lake, at the state line, is generally good and there is no interstate pollution of Wolf Lake.

Lever Brothers Company, Hammond: The Company located at Hammond in 1930. Potable water is purchased from Hammond and process water, 10.5 million gallons per day, is pumped from Lake Michigan. All plant sewage and some industrial wastewater is discharged to the Hammond Sanitary District sewerage system. About 10 million gallons per day of treated process wastewater and cooling water is discharged to Wolf Lake.

Pollution of the channel which conveys the Company's wastewater to Wolf Lake is evident. This pollution neither extends into Wolf Lake proper nor does it cause interstate pollution of Wolf Lake. The Company's pollution of Wolf Lake Channel has been of concern to the Board for many years, and administrative hearings were scheduled in 1956 and 1961.

A ten-day hearing was held in 1962.

Oh, I might say, there was evidence that was presented on fish kills and the tainting of fish flesh, but since that date, 1962, we have received no complaints of any fish kill in Wolf Lake or reports of tainting of fish.

As a result of the 1962 hearing, the Company retained an engineer to review operations and make improvements where investigations indicate improvements are needed.

In 1944, the Company installed raw water chlorination equipment. Sufficient chlorine is added to maintain a residual in the wastewater discharged to

Wolf Lake. In 1952, two air flotation units were installed. Two basins for removal of settleables and floatables are in use. Because of the relatively low strength of the total plant effluent, the Company has been reluctant to provide secondary biological treatment. The Company is attempting to improve in-plant waste prevention measures. About $750,000 has been expended by the Company for pollution control facilities.

Conclusions: The Great Lakes-Illinois River Basin report of the Department of Health, Education, and Welfare is needed to establish water quality criteria for Lake Michigan. These criteria are absolutely essential to the determination of final sewage and waste treatment requirements.

The Board's Water Quality Monitoring Program has a sufficient number of stations to determine quality of the waters in the Indiana portion of the basin. The Department of Health, Education, and Welfare's report for this conference recommends continuously recording monitors at selected locations and for selected indices.

Monitors currently available have limitations on pollutants that can be measured. Maintenance is difficult, and a careful investigation should be conducted before a decision is made on installation.

If continuously recording monitors for the pollutants of concern are available, this would improve the data and make it more usable.

Major industrial plants should institute permanent effluent sampling programs. Data obtained from these programs should be submitted to the Board.

The O'Brien Lock should be placed in operation to provide more positive control of the flow from Lake Michigan and reduce the reversal of flow from the Calumet River to Lake Michigan, which affects Indiana waters.

All municipalities, except Porter, are providing secondary treatment and some are providing effluent chlorination.

The remainder of the municipal and the semi-public installations have been advised to provide effluent chlorination.

The Board intends to take whatever action is necessary to obtain compliance.

The waters discharged from Burns Ditch to Lake Michigan and from Wolf Lake to Illinois do not contribute to interstate pollution.

When existing sewage works are augmented by facilities now under construction and planned, the waters of the Grand and Little Calumet Rivers where they cross the State line will be as good as modern sewage treatment practices can make them, except during periods of stormwater overflows.

The Grand Calumet River and Indiana Harbor Canal dry water flow is practically all industrial cooling and process waters and waste treatment plant effluents.

The origin and character of this flow must be considered in development of water quality criteria.

Once the water quality is established, the Board will insist on the needed improvements

The water quality monitoring records for the Whiting Water Plant for the past eight years, and for the Dickey Road Station on the Indiana Harbor Canal for the past five years, show little if any deterioration of the water quality during those periods.

This indicates the Board is holding the line on pollution even with increasing industrial expansion and population growth.

The waters in Lake Michigan will improve once the Great Lakes-Illinois River Basin criteria have been established and additional treatment of waste reduction is provided.

The number of semi-public installations have been eliminated and connections made to municipal sewers. This is in compliance with a condition in the Board's approvals requiring connection when municipal sewers become available.

The Board will press for the elimination of these installations as public sewer systems become available.

The Indiana law is adequate to achieve the desired water quality for the basin.

Thank you.

CHAIRMAN STEIN: Thank you, Mr. Miller.

(Applause.)

Mr. Poole.

Mr. Poole, I always knew you were an enduring bunch in Indiana, but I never fully appreciated the extent of your staying power until now.

Perry, that was a virtuoso performance and I know you are not a bit tired. But at the request of Mr. Poole and to give the conferees time to collect themselves and because there are commitments to two Mayors we'd like to put on, we are going to ask the conferees to withhold their questions, perhaps, until after lunch, in order to meet these schedules.

Mr. Poole.

MR. POOLE: We have two Mayors who have early afternoon engagements back home and if you will indulge us for a while longer, I'd like to call on Mayor John Nicosia of the City of East Chicago.

Incidentally, he is an M.D. of some 30-odd years experience, I believe.

Mayor Nicosia.

MAYOR NICOSIA: Mr. Chairman, conferees, distinguished guests, ladies and gentlemen, fellow Hoosiers. I am Dr. John B. Nicosia, Mayor of East Chicago, Indiana.

Having been a medical doctor for 30 years and a mayor for only one, the practice of maintaining the good health of my patients has now been extended to encompass the well-being of all the citizens of East Chicago. Immediately upon my taking office, my attention was directed to pollution, both air and water.

The Sanitary District Sewage Treatment Plant has been operating at a very high degree of efficiency with suspended solids removal of 94.7 percent and BOD removal of 85.9 percent.

Chlorination of plant effluent discharged into the Calumet, Grand Calumet has produced waste water with better characteristics than is available in Lake Michigan for water purification purposes. The MPN test showed an average count of 7.2 per 100 ml.

Monthly reports are standardized to correspond with Indiana State Board of Health forms.

A bacteriological control laboratory has been constructed and is at present being set to standards for water purification.

I might make a comment here now, that no one has set a standard for disinfecting of sewage waste and, therefore, we are following a water purification standard in treating our sewage.

As to the water situation in East Chicago, may I make these points:

First, in general, our water supply is very good and trouble free. There are intermittent instances when some problems of taste and odor arise, but these are minute. The indication of the minor nature of this taste and odor problem is illustrated by the fact that chemical treatment costs, per million gallons treated, have declined almost 5 percent since 1959.

Second, East Chicago's Municipal Beach has never been closed because of contamination or pollution.

For the record, Mr. Chairman, I would like to correct several statements made in the February 1965 report of the United States Department of Health, Education, and Welfare as presented to this conference.

On page 16, it is stated that,quote "It is understood that the East Chicago Plant has chlorination facilities but they are not regularly operated" end of quote. As I stated earlier, chlorination facilities in the East Chicago Sanitary District are in continual use in disinfecting the plant effluent.

In Table VI-1A, there appears a footnote (b) which does not apply to East Chicago. This, I beg to say, applies to Gary Township and not East Chicago.

In the Corrective Action Needed" which was recommended, recommendation No. 5 states, "A dam be built across the Grand Calumet River to prevent uncontrolled flows from Lake Michigan to the Illinois River through that channel. Preferred location of the dam is east of the outfall from the East Chicago Municipal Waste Treatment Plant."

I would like to urge the conferees to study this recommendation more closely, to determine jointly, with all those affected, industries, municipalities, local, county and state officials, as to the overall effect such a dam would have on the surrounding area.

Recommendation No. 7 states:

> "Hammond and East Chicago investigate the feasibility of constructing lagoons for further treatment of waste effluents. Part of the existing poorly-drained flood plain of the Grand Calumet River might be utilized for this purpose, with levees around the lagoons high enough to prevent flooding, and improved bypass channels for storm drainage."

I have present with me today Cornel Leahu, Superintendent of the East Chicago Sanitary District, who will present a statement in which he discusses this recommendation.

Recommendation No. 8 states:

> "All sanitary wastes be disinfected before discharge. Disinfection should be practiced in the manner prescribed by State water pollution control agencies and mutually agreed upon between the two states."

I must repeat that East Chicago's Sanitary District is disinfecting sanitary wastes at present. This recommendation, however, does bring up the need for a definitive agreement among the agencies involved. I would recommend prompt action on this point.

I would like to comment that I know of no definite standard of disinfecting sanitary wastes which would be amenable to both states.

As Mayor of the City of East Chicago, I pledge by City Administration to work tirelessly for pollution abatement to preserve the God-given resource at our doorstep.

Mr. Chairman, I would also like to make a comment with your permission.

Looking over your agenda, it seems strange to me that some of the major industries in Illinois such as Wisconsin Steel Works, Interlake Iron Works, Republic Steel Works, Acme Steel Works, Sherwin Williams, et cetera, et cetera, and many of the industries that I am certain border on the waterways and tributaries and who are involved in this particular situation that we are discussing here don't seem to be represented.

I get the impression that, perhaps, the State of Indiana is the whipping boy here.

I hope that I am wrong, but for the interest of everybody concerned and certainly for the success of this type of a program, I think that it is no more than fair and right that the Illinois industries should have some representation to be cross-examined just like those of the State of Indiana.

Thank you.

(Applause.)

CHAIRMAN STEIN: Mr. Mayor, would you wait a moment?

This question has come up before and I am sure it will appear in the record that the question has been asked and an answer has been given.

Again, let me explain the Federal position on this: When this law was first developed, representatives of the states came before the conference and urged that at this stage of Federal enforcement proceedings, the Federal Government not get in touch with the individual, allegedly dischargers directly; that is, municipalities or industries--that we deal with the states and the states do this.

I think we have dealt with both industry and Illinois on an equal basis.

I think Mr. Klassen has indicated the jurisdictional problem in Illinois which has led to the situation to which you alluded, but I think as far as the Federal law is concerned, the Congress has made it abundantly clear what we are supposed to do.

Now, personally, I do believe that conferences are best when all industries are asked to participate, because no one can tell the story for you as you can yourself. However, there have been conferences that we have had in other parts of the country with state agencies when they have invited no one to participate other than themselves.

Under the law as presently constituted, this is the situation.

MR. KLASSEN: Yes, I just want to amplify that, Mayor, because this question was asked yesterday.

The territory involved here, with the exception of the three little white areas that you see on the map, are all under the jurisdiction of the Metropolitan Sanitary District of Chicago and are exempt from state jurisdiction. We have a specific Attorney General's opinion stating that the Water Board of the State of Illinois has no jurisdiction, nor no control over waste entering Lake Michigan that originates within the Sanitary District. This is the reason that the Sanitary Water Board has not invited the industries, and has given this prerogative in writing to the Chicago Sanitary District.

Whether or not they call in industries, I do not know, and this undoubtedly will be determined.

when the Sanitary District time comes up to do this.

If industries are called, they will have to be called by the Sanitary District. This is their responsibility under the law.

MAYOR NICOSIA: Mr. Klassen, I appreciate your remarks and your explanation. But if we are dealing with a problem that everybody knows is critical throughout this area and certainly has been critical for the last hundred years, and if we are dealing with industries who seem to be -- shall we say -- the major offenders, I think it is no more than feasible and fair that the Sanitary District of the City of Chicago should have made an effort so that we, from the State of Indiana, could listen to their side of the story. We feel that we are being whipped here in this particular conference, and we just don't like it in Indiana to get whipped unless we get a fair fight.

MR. KLASSEN: I agree with you.

MR. CHESROW: Dr. Nicosia, for your information, the Sanitary District has invited industry to participate.

I want to point out that probably you don't know that the Sanitary District of Greater Chicago does have a very effective industrial waste ordinance that is being complied with, and it will be brought out tomorrow when we present our story.

MAYOR NICOSIA: If that is so, I stand corrected, but I still want to be on the record. I want to make sure that this is so.

Thank you.

(Applause.)

Mr. Leahu will follow me.

MR. LEAHU: Mr. Chairman, my name is Cornel Leahu, Superintendent of the East Chicago Sanitary District located at 5200 Indianapolis Boulevard, East Chicago, Indiana.

Mr. Chairman, honorable conferees, distinguished guests, members of the conference, I was directed by the Commissioner of the East Chicago Sanitary District to read into the record their address that is given on our report which we hope will be included in the printing of the record.

Honorable Anthony J. Celebrezze, Secretary of Health, Education, and Welfare, Indiana and Illinois Water Pollution Conference, McCormick Place, Chicago, Illinois.

Honorable Mr. Secretary: Our distinguished Mayor, Dr. John B. Nicosia, enjoined the East Chicago Sanitary District to undertake a positive program to abate any stream pollution that could be attributed to our municipality. We, in the District, are operating a Guggenheim Bio-chemical Treatment Plant with a capacity of twenty (20) million gallons per day. Presently we are treating an average of ten (10) million gallons per day. Our BOD removal varies from eighty-eight (88) to ninety-five (95) percent efficiency of removal. The effectiveness of our suspended solids removal is in the same category.

Following our Mayor's directive, we experimented with chlorination of the plant effluent in June of last year. The Sanitary District Commissioners wrote to the Indiana State Board of Health requesting a directive to chlorinate our effluent. We were in need of documentation with teeth in it to justify additional appropriations with which to purchase chlorine. This was not forthcoming; rather we received a letter urging the Commissioners to place chlorination into effect and hire a consultant engineer, not a directive. The District took it upon itself to obtain monies earmarked for chemicals and use this exclusively for chlorine. At present, rather than vacuum filtering sludge, we have and are continuing to construct sludge lagoons. In this manner, monies saved by not purchasing chemicals for vacuum filtration are expended on chlorine.

We experimented for six months in 1964, from June through December, obtaining information regarding contact time to produce an acceptable chlorine residual. We use our effluent channel as a contact tank. The mechanics for this being completed we went one step further and proceeded to reduce the presence of members of the coliform group. At this time, we did not have the facilities for bacteriological analysis, therefore, we took our samples to the Gary- Hobart Water Company, an independently owned and operated utility. Their analysis, as documented, both on the multiple tube fermentation technique and by the membrane filter technique, indicate that our plant effluent has better characteristics than the raw water from Lake Michigan. We are finishing our bacteriological laboratory so we may remain on top of this abatement program and preserve the effort that has been expended to date.

The Sanitary District has several plans which are being entertained but, due to limited funds available, would require Federal participation to accomplish: these are:

(1) Separate the sewer system in East Chicago.

(2) When separated, remove particulate matter from the storm sewer effluent and chlorinate.

(3) Construct tertiary treatment for the sewage disposal plant to produce potable water for sale or reuse.

These programs, though highly ambitious, we feel are the only answer to positive abatement of any pollution attributable to the East Chicago Municipal Sanitary District. The Sanitary District Board of Commissioners would also like to recommend, to the Army Corps of Engineers, to resume discussion and planning of widening and straightening the Grand Calumet River; to reconsider a proposal to connect the Lake Michigan breakwater from the Gary Lighthouse to South Chicago; put in locks and in general create a tremendous settling basin to maintain our God-given resource, Lake Michigan, pure and pollution free.

Respectfully submitted, Peter E. Auksel, President; Carlos Borge, Vice-president; A. G. Giannini, Secretary.

The report and statistics provided were presented by me and are in retrospect to the previous statistical data. I wish to bring this additional information.

The dissolved oxygen demand of the East Chicago Municipal Sanitary District effluent, as discharged into the Grand Calumet River and the Lake Michigan Basin, is on the average for the year 1964, 3,163 in population equivalent (PE).

The average coliform density of the East

Chicago Municipal Sanitary District Sewage Treatment Plant effluent, as documented by impartial laboratory analysis of the Gary-Hobart Water Corporation, discharged into the Grand Calumet River and the Lake Michigan Basin, was, for the month of February 1965, in the order of 7.2 per 100 ml. Bacterial disinfection of this magnitude indicates an extremely successful treatment process.

The Sanitary District, at the behest of our tireless Mayor, Dr. John D. Nicosia, is presently studying feasibility reports and negotiating with industry the possibility of diverting industrial wastes (phenolics, ammonia, nitrates, nitrites, cyanide,) to the District for final treatment. Studies at present indicate this may be accomplished by settling in a deep lagoon, aereating and chlorinating, prior to discharge into the Grand Calumet River and the Lake Michigan Basin.

This report and statistical data of the Sanitary District of the City of East Chicago, Indiana, is hereby respectfully submitted to the Honorable Dr. John B. Nicosia, Mayor, the Sanitary Commissioners, Honorable Secretary Anthony J. Celebrezze of the Department of Health, Education, and Welfare, Honorable Murray Stein, Chairman of the Conference, and the Indiana State Board of Health, this 2nd day of March, 1965.

Thank you.

CHAIRMAN STEIN: Thank you, Mr. Leahu.

Your technical report will appear in the record and will be referred to in the report. It will, of course, include columns of figures. This record will be available for inspection in Washington and in Chicago at all times during business hours.

REPORT ON
TREATMENT PROCESS PRIOR TO DISCHARGE INTO THE WATERS OF THE GRAND CALUMET RIVER, LITTLE CALUMET RIVER, LAKE MICHIGAN, AND THEIR TRIBUTARIES.

EAST CHICAGO SANITARY DISTRICT

HONORABLE DR. JOHN B. NICOSIA, MAYOR

CORNEL A. LEAHU, SUPERINTENDENT

BOARD OF SANITARY COMMISSIONERS

PETER E. AUKSEL	PRESIDENT
CARLOS BORGE, P. E.	VICE-PRESIDENT
A. G. GIANNINA, P. E.	SECRETARY

TABLE OF CONTENTS

Page No.

I FOREWARD 847
Honorable Dr. John B. Nicosia, Mayor
II SUMMARY AND CONCLUSIONS 849
Sanitary Commissioners 853
Exhibit "A" 854
Gary-Hobart Summary 855
Gary-Hobart Examination 2/5/65 857
Gary-Hobart Examination 2/8/65 858
Gary-Hobart Examination 2/15/65 859
Gary-Hobart Examination 2/23/65 860

III BACKGROUND

Plant Design Information 861
Statistical Summary 862
Description of Treatment Process 863
Table 2 -- Sewage Flow and Solids Removed 867
Table 3 - Characteristics of Raw Sewage 868
Table 4 - Settleable Solids 869
Table 5 -- Suspended Solids and % Removal 870
Table 6 - B.O.D. and % Removal 871
Table 7 - % Volatile Suspended Solids 872
Table 8 - Grit -- Screenings -- Scum Removed 873
Table 9 - pH 874
Table 10 - Mixed Liquor - Return Sludge Data 875

Page No.

Table 11 - Aeration Data 876

Table 12 - Air Consumption 877

Table 13 - Comminutors 878

Table 14 --Air Blowers in Operation 879

Table 15 - Return Sludge Pumps 880

Table 16 - Detritor and Cleaning Mechanism 881

Table 17 - Raw Sludge to Digesters Data 882

Table 18 - Sludge Vacuum Filtration Data 883

Table 19 - Gas Engine Operation 884

Table 20 - Summary Showing Monthly Payroll 885

Table 21 - Summary Showing Utility Costs 886

Table 22 --Summary Showing Monthly Fuel Oil Costs 887

Table 23 - Summary Electric Power Costs 888

Table 24 - Summary Monthly Chemical Costs 889

Table 25 --Budget Classification 890

IV SUBMISSION NOTE 891

Conclusion by the Superintendent

V MONTHLY REPORTS OF OPERATION FOR THE YEAR 1964 895

CITY OF EAST CHICAGO
East Chicago, Indiana
Office of the Mayor

Dr. John B. Nicosia, Mayor

February 16, 1965

Gentlemen:

Having been a medical doctor for 30 years and a mayor for only one, the practice of maintaining the good health of my patients has now been extended to encompass the well-being of all the citizen's of East Chicago. Immediately, upon my taking office, my attention was directed to pollution, both air and water.

I called my Sanitary District Board of Commissioners, together with the new Superintendent, and requested a complete resume of what was being done to abate pollution. The returned report was shocking to say the least. Prior to 1964, the Sanitary District had filed a monthly report to the State Board of Health but not on their standard form. I found that chlorination facilities were available to chlorinate plant effluent but were never used for this purpose. I immediately directed the Sanitary District to do everything within their jurisdiction of work to abate further pollution of the Grand Calumet River.

It is with gratifying satisfaction that I can now report the following:

(1) The Sanitary District Sewage Treatment Plant has been operating at a very high degree of efficiency.

(2) Chlorination of plant effluent has produced a waste water with better characteristics than is available in Lake Michigan for water purification purposes.

(3) Monthly reports are standardized to correspond with Indiana State Board of Health forms.

(4) A bacteriologial control laboratory has been constructed and is at present being set to standards for water purification.

Gentlemen, all this has been accomplished in less than a year, without additional expenditures to burden the taxpayer. A more ambitious program, which the Sanitary District is at present entertaining, would require the assistance of Federal funds. These other programs are of such magnitude that to embark on them, to make Federal waterways acceptable to fish life, recreation, and possible potability, is not within the financial scope of the Sanitary District.

Sincerely,
Dr. John B. Nicosia, Mayor
East Chicago, Indiana

EAST CHICAGO SANITARY DISTRICT

5200 Indianapolis Blvd.
East Chicago, Indiana 46312

EXport 7-1068

Dr. John B. Nicosia
Mayor

Cornel A. Leahu
Superintendent

February 23, 1965

Hon. Anthony J. Celebrezze
Secretary of Health, Education, and Welfare
Indiana & Illinois Water Pollution Conference
McCormick Place
Chicago, Illinois

Hon. Mr. Secretary:

Our distinguished Mayor, Dr. John B. Nicosia, enjoined the East Chicago Sanitary District to undertake a positive program to abate any stream pollution that could be attributed to our municipality. We, in the District, are operating a Guggenheim biochemical treatment plant with a capacity of twenty (20) million gallons per day. Presently, we are treating an average of ten (10) million gallons per day. Our B.O.D. removal varies from eighty-eight (88) to ninety-five (95) percent efficiency of removal. The effectiveness of our suspended solids removal is in the same category.

Following our Mayor's directive, we experimented with chlorination of the plant effluent in June of last year. The Sanitary District Commissioners wrote to the Indiana State Board of Health requesting a directive to chlorinate our effluent. We were in need of documentation with teeth in it to justify additional appropriations with which to purchase chlorine. This was not forthcoming; rather we received a letter urging the Commissioners to place chlorination into effect and hire a consultant engineer, not a directive. The District took it upon itself to obtain monies earmarked for chemicals and use this exclusively for chlorine. At present, rather than vacuum filtering sludge, we have and are continuing to construct sludge lagoons. In this manner, monies saved by not purchasing chemicals for vacuum filtration are expended on chlorine.

We experimented for six months of 1964, from June through December obtaining information regarding contact time to produce an acceptable chlorine residual; we use our effluent channel as a contact tank. The mechanics for this being completed we went one step further and proceeded to reduce the presence of members of the coliform group. At this time, we did not have the facilities for bacteriological analysis, therefore, we took our samples to the Gary Hobart Water Company, an independently owned and operated utility. Their analysis, as documented, both on the multiple tube fermentation technique and by the membrane filter technique, indicate that our plant effluent has better characteristics than the raw water from Lake Michigan. We are finishing our bacteriological Laboratory so we may remain on top of this abatement program and preserve the effort that has been expended to date.

The Sanitary District has several plans which are being entertained but, due to limited funds available, would require Federal participation to accomplish; these are:

(1) Separate the sewer system in East Chicago.

(2) When separated, remove particulate matter from the storm sewer effluent and chlorinate.

(3) Construct tertiary treatment for the sewage disposal plant to produce potable water for sale or reuse.

These programs, though highly ambitious, we feel, are the only answer to positive abatement of any pollution attributable to the East Chicago Municipal Sanitary District. The Sanitary District Board of Commissioners would also like to recommend, to the Army Corps of Engineers, to resume discussion and planning of widening and straightening the Grand Calumet River; to reconsider a proposal to connect the Lake Michigan breakwater from the Gary Lighthouse to South Chicago; put in locks and in general create a tremendous settling basin to maintain our God given resource, Lake

Michigan, pure and pollution free.

Respectfully submitted,

Peter E. Auksel, President

Carlos Borge, Vice-President

A. G. Giannini, Secretary

Board of Sanitary Commissioners

Attest: Cornel A. Leahu,
Superintendent

State of Indiana
STREAM POLLUTION CONTROL BOARD
1330 West Michigan Street
Indianapolis, Indiana 46207

April 22, 1964

Board of Sanitary Commissioners
East Chicago Sanitary District
5200 Indianapolis Boulevard
East Chicago, Indiana

Gentlemen:

Re: Chlorination Facilities, Sewage Treatment Plant, East Chicago Sanitary District.

The East Chicago sewage treatment plant provides primary and secondary treatment for sewage originating within the East Chicago Sanitary District. In addition, the East Chicago plant has chlorination facilities utilizing the effluent channel for a chlorine contact tank.

It is the purpose of this letter to urge the East Chicago Board of Sanitary Commissioners to:

1. Repair, if necessary, and place in operation chlorination equipment presently on hand. Such facilities should be used on a continuous basis.
2. Retain the services of a consulting engineering

firm to study the adequacy of the East Chicago sewage treatment plant effluent chlorination and to render a report with recommendations for improving the facilities.

A reply relative to the above should be submitted to this office not later than June 1, 1964.

If we can be of further assistance in this matter, please feel free to call on us.

Very truly yours,
B. A. Poole,
Technical Secretary

VGW/gwn

cc: Ted Leahu, Superintendent, East Chicago Sanitary District

GARY-HOBART WATER CORPORATION
650 Madison Street
Gary, Indiana 46401

February 26, 1965

Mr. Ted Cornel Leahu
East Chicago Sewage Dept.
5200 Indianapolis Blvd.
East Chicago, Indiana

Dear Mr. Leahu:

The results of the coliform bacteria test run on the East Chicago sewage plant effluent submitted to us, by Mr. Popa, show a definite decrease for the month of February. The M.P.N. test showed an average count of 7.2 for the four (4) samples submitted, while the membrane Filter test had an average of 35 colonies per one-hundred (100) milliliters for the same four (4) samples. The enclosed bacteriological report sheets show the actual count obtained from each sample submitted.

These results can be compared to the average coliform bacteria concentration, for the past nine (9) years of 228 per one-hundred (100) milliliters of water for our raw water taken from Lake Michigan. This average is obtained by using the M.P.N. charts according to "Standard Methods for the Examination of Water, Sewage and Industrial Wastes."

The sewage effluent samples submitted to us are performed impartially by the water quality control laboratory of the Gary-Hobart Water Corporation.

Sincerely yours,

/S/ Herbert L. Plowman, Jr.
Chief Chemist

HLP:jk

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

Sample Point of Collection	Sample Number	Residual Chlorine	37 Plate Count	Membrane Filter	Portion	Lauryl	Tryptose Broth	B. G. B. From 24 hr. Broth		B. G. B. From 48 hr. Broth		E. M. B. 24 hr.	Lactose from E. M. B.	Formate-Ricenoleate 48 hr.	Coliform Confirmed	M. P. N. per 100 ml.
						24 hr.	48 hr.	24 hr.	48 hr.	24 hr.	48 hr					
EAST CHICAGO INDIANAPOLIS	1				2	5+		5+							5+	350,000
				TNC	0	5+		5+							5+	
		M.F.		60	-2	5+		5+							5+	
		100,000		19	-3	5+		5+							5+	
				7	-4	5+		5+							5+	
					-5	5+		5+							5+	
					-6	1+	1+	1+	–	1+	–				2+	
KENNEDY	2				2	5+		5+							5+	31,000
		MF		TNC	0	5+		5+							5+	
		14,000		77	-2	5+		5+							5+	
				4	-3	5+		5+							6+	
					-4	1+		–	–						–	
					-5	1+		1+							1+	
					-6	–	–									
PLANT	3				2	1+	2+	1+	–	1+	1+				3+	11
		M.F.		–	0	–	2+			1+	–				1+	
		20		–	-2											
					-3											
					-4											
					-5											
					-6											
				1	1											

Portion Examined

5 = 250 ml	0 = 1 ml
4 = 100 ml	- 1 = 0.5 ml
3 = 50 ml	- 2 = 0.1 ml
2 = 10 ml	- 3 = 0.01 ml
1 = 5 ml	- 4 = 0.001

-5 = 0.0001
-6 = 0.00001

Day Friday Date Feb. 5 1965

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

Sample Point of Collection	Sample Number	Residual Chlorine	37 Plate Count	Membrane Filter	Portion	Lauryl Tryptose Broth		B. G. B. From 24 hr. Broth		B. G. B. From 48 hr. Broth		E. M. B. 24 hr.	Lactose from E. M. B.	Formate-Ricenoleate 48 hr.	Coliform Confirmed	M. P. N. per 100 ml.
						24 hr.	48 hr.	24 hr.	48 hr.	24 hr.	48 hr					
PLANT				3	2	-	-								-	0
EAST CHICAGO				—	0	-	-								-	
		M.F. 30			-2	-	-								-	
					-3	-	-								-	
					-4	-	-								-	
					-5	-	-								-	
					-6	-	-								-	
				-	1	-	-									

Portion Examined

5 = 250 ml	0 = 1 ml
4 = 100 ml	- 1 = 0.5 ml
3 = 50 ml	- 2 = 0.1 ml
2 = 10 ml	- 3 = 0.01 ml
1 = 5 ml	- 4 = 0.001

Day Monday Date Feb. 8, 1965

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

Sample Point of Collection	Sample Number	Residual Chlorine	37 Plate Count	Membrane Filter	Portion	Lauryl Tryptose Broth		B. G. B. From 24 hr. Broth		B. G. B. From 48 hr. Broth		E. M. B. 24 hr.	Lactose from E. M. B.	Formate-Ricenoleate 48 hr.	Coliform Confirmed	M. P. N. per 100 ml.
						24 hr.	48 hr.	24 hr.	48 hr.	24 hr.	48 hr					
PLANT				7	2	1+	1+	1+		—	1+				2+	6.8
– EAST CHICAGO		M.F.		—	1	1+	—	1+							1+	
		70		—	0	—	—									
				—	-2	—	—									
					-3	—	—									
					-4	—	—									

Portion Examined

5 = 250 ml	0 = 1 ml
4 = 100 ml	- 1 = 0.5 ml
3 = 50 ml	- 2 = 0.1 ml
2 = 10 ml	- 3 = 0.01 ml
1 = 5 ml	- 4 = 0.001

Day Monday Date 2-15-1965

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

GARY-HOBART WATER CORPORATION
REPORT OF BACTERIOLOGICAL EXAMINATION

Sample Point of Collection	Sample Number	Residual Chlorine	37 Plate Count	Membrane Filter	Portion	Lauryl	Tryptose Broth	B. G. B. From 24 hr. Broth		B. G. B. From 48 hr. Broth		E. M. B. 24 hr.	Lactose from E. M. B.	Formate-Ricenoleate 48 hr.	Coliform Confirmed	M. P. N. per 100 ml.
						24 hr.	48 hr.	24 hr.	48 hr.	24 hr.	48 hr					
PLANT				11	3											11
EAST CHICAGO					2	1+		–	–						–	
				–	1											
		M.F		–	0	4+	–	4+							4+	
		2D			-2	2+	–	2+							2+	
					-3	–	–								–	
					-4	–	–								–	
					-5	–	–								–	
					-6	–	–								–	
															–	

Portion Examined

5 = 250 ml	0 = 1 ml
4 = 100 ml	- 1 = 0.5 ml
3 = 50 ml	- 2 = 0.1 ml
2 = 10 ml	- 3 = 0.01 ml
1 = 5 ml	- 4 = 0.001

Day Tuesday Date Feb. 23, 1965

PLANT DESIGN INFORMATION

ENGINEER	RUSSELL B. MOORE
CONTRACT OF COST	$2,277,199.87
TYPE OF TREATMENT	GUGGENHEIM BIOCHEMICAL
DATE PLANT STARTED	MAY, 1945
DESIGN POPULATION	64,800
TYPE OF SEWERAGE SYSTEM	COMBINED
DESIGN FLOW (MILLION GALLONS PER DAY)	20.0
DESIGN MAXIMUM HOURLY RATE (MILLION GALLONS)	30.0
DESIGN STRENGTH OF RAW SEWAGE	150
INDUSTRIAL WASTES	OIL, PICKLING LIQUOR
PRIMARY SETTLING TANKS	320,000
DESIGN RATE * PRIMARY DETENTION PERIOD IN HOURS	1.15
AERATION UNITS (4) CAPACITY OF EACH IN GALLONS	509,000
DESIGN RATE-AERATION DETENTION PERIOD IN HOURS-20% RETURN SLUDGE	2.04
FINAL SETTLING TANKS (3) CAPACITY OF EACH IN GALLONS	407,000
DESIGN RATE - FINAL DETENTION PERIOD IN HOURS	1.7
FINAL WEIR LENGTH IN FEET	942

DIGESTION TANK DATA

EQUIVALENT POPULATION SUSPENDED SOLID BASIS	100,000
SUSPENDED SOLIDS RAW SEWAGE / DAY	20,000 lbs.
SUSPENDED SOLIDS REMOVED / DAY	19,200 lbs.
VOLUME SOLIDS TO DIGESTERS / DAY	14,400 lbs.
VOLUME REQUIRED @ 25 CU. FT./LBS. VOLATILE ADDED/DAY	360,000 cu.ft

DIGESTION TANK DATA (cont'd)

CU. FT. / EQUIVALENT POPULATION	3.6
VOLUME STORAGE TANK	370,000 cu.ft.

STATISTICAL SUMMARY 1960-1961-1962-1964

	1960	1961	1962	1964
POPULATION SERVED (ESTIMATED)	64,800	64,800	64,800	64,800
SEWAGE TREATED, MILLION GALLONS	4,434,080	3,914,470	3,775,432	3,796,891
SEWAGE TREATED, MILLION GALLONS DAILY	12.123	10.718	10.342	10.402
SUSPENDED SOLIDS REMOVED, POUNDS	3,735,355	4,472,709	4,976,506	3,972,468
5-DAY B.O.D. REMOVED, POUNDS	2,952,290	3,460,636	3,735,822	2,502,774
GRIT REMOVED, CUBIC FEET	2,100	2,030	1,140	2,500
SCUM REMOVED, CUBIC FEET	1,006	1,129	1,360	1,946
*SCREENINGS REMOVED, CUBIC FEET	1,335	1,157	1,294	1,356
REMOVAL OF SUSPENDED SOLIDS, PERCENT	93.4	94.2	96.4	94.7
REMOVAL OF BIOCHEMICAL OXYGEN	86.6	86.0	87.9	87.6

* SCREENINGS REMOVED FROM ALDER STREET

PUMPING STATION ONLY.

DESCRIPTION OF TREATMENT PROCESS

Stormwater and sanitary wastes flow, by gravity, through a combined sewerage system to sewage lift stations located at Alder Street in the Calumet Addition to Indiana Harbor, and at 151st and Magoun Avenue in East Chicago; the Alder Street pumping station handling all wastes from the Indiana Harbor - Marktown - Calumet sections of East Chicago and the Magoun Avenue pumping station handling the remainder of the City's wastes. Pumping stations located at Broad and Spruce Streets in Marktown: Canal Street and the Indiana Harbor Ship Canal: Michigan and Sheridan Avenue: serve as relay stations for the Alder Street pumping station. Mechanically cleaned fixed bar screens used to remove floating and large suspended solids are in operation at both pumping stations. Gruendler sewage shredders used for shredding screenings are also in operation at the Magoun Avenue pumping station.

In addition to stormwater pumps, the City of East Chicago has in operation, three horizontal dual speed sewage lift pumps, having a combined capacity of 28 million gallons per day at 45' T.D.H., at the Alder Street station, and three vertical motor driven, open shaft, non-clog sewage pumps, having a combined capacity of approximately 15 million gallons per day against 38' T.D.H., at the Magoun Avenue station. These pumps lift the sewage and pass it through force mains to the sewage treatment plant at 152nd and Indianapolis Boulevard.

Industrial-sanitary wastes, upon entering the sewage treatment plant, first pass through two Chicago comminutors; each with a capacity of 20 million gallons daily. These units shred large particles making the character of sewage more consistent and preventing the clogging of the numerous pipelines, pumps, and other mechanical equipment located in the treatment plant. In the event of emergency the sewage can bypass this stage of the treatment process, flowing through a manually cleaned fixed bar screen. After treatment, by the comminutors, the sewage passes into a 30-foot square Dorr Detritor which removes the heavier inorganic solids. The sewage then passes through a 60-inch pipe to the primary distribution well and to three Dorr primary settling tanks. These tanks are designed to retain the sewage for 1.5 hours; each having a capacity of 320,000 gallons. The effluent from these tanks then proceeds to four aeration tanks; each with a capacity of 509,000 gallons. The aerators supply air at the rate of 3,470 cubic feet per minute and retain the sewage for two and a half hours. It is at this point that the design calls for the application of secondary return sludge in an amount of 20 percent of the volume of flow and introduction of aluminum sulfate (alum) at the rate of .4 grains per gallon.

The aerated sewage then proceeds to the three final settling tanks, each with a capacity of 470,000 gallons, where it is detained for 1.7 hours. The finished effluent is then disinfected and discharged into the Grand Calumet River:

PLANT EQUIPMENT INCLUDES A PAIR OF WALLACE AND TIERNAN CHLORINATORS THAT ARE USED TO CHLORINATE THE FINAL EFFLUENT.

Sludge, from the primary tanks, is drawn off into two primary sludge digesters; a fixed cover Dorr-Oliver and a floating cover Pacific flush tank. Digested sludge is transferred daily to 2 Pacific flush tank company secondary digesters. Digested sludge is treated with ferric chloride and lime, and vacuum filtered on two, 8' diameter - 10' length, Emico filters.

The dewatered sludge is then conveyed to a Nichols multiple hearth incinerator for final destruction. This incinerator has a capacity of reducing 1,750 pounds of dry solids per hour and will destroy sludge with a moisture content as high as 75 percent. All sludge from the secondary tanks returns to some point in the plant process. Chicago screw impeller pumps move part to the aeration tanks, and part to the primary tanks.

The plant originally was intended to be constructed out of WPA funds, with a contractor retained for supervision and furnishing equipment. However, before construction was complete, this WPA support was withdrawn, and the city was faced with the extremely difficult task of completing construction in the face of wartime restrictions and manpower shortages. The plant has been in full operation since about the 1st of June 1945.

* * *

TABLE 2

SEWAGE FLOW - WATER WORKS PUMPAGE
AND
SOLIDS MATTER REMOVED FROM SEWAGE

MONTHS	SEWAGE FLOW M.G.D.	WATER WORKS PUPMAGE M.G.D. (1)	SEWAGE FLOW GAL. CAPITA	POUNDS SUSPENDED SOLIDS REMOVED DURING THE MONTH (2) TOTAL	VOLATILE	PRIMARY DETENTION PERIOD IN HOURS (3)
JANUARY	10.1	14.2	177	422,454	308,391	2.3
FEBRUARY	9.3	14.4	163	439,723	294,614	2.5
MARCH	11.1	14.5	195	346,229	249,285	2.0
APRIL	12.9	14.9	266	401,421	260,924	1.8
MAY	12.5	16.0	219	349,029	223.379	1.8
JUNE	10.5	16.3	184	217,351	147,790	2.2
JULY	10.5	16.5	184	201,425	145,026	2.2
AUGUST	9.7	16.4	170	246,946	180,271	2.4
SEPTEMBER	8.6	16.3	150	292,710	207,824	2.8
OCTOBER	9.5	15.0	167	466.023	354.177	2.5
NOVEMBER	9.5	14.4	167	362,880	257,645	2.4
DECEMBER	10.2	14.9	179	317,688	222,382	2.3
1964 AVERAGE	10.4	15.3	185	331.039	231,211	2.3
1962 AVERAGE	10.3	16.124	160	414.709	296,296	2.2
1961 AVERAGE	10.738	14.959	165	364,784	263,035	2.2
1960 AVERAGE	12.177	12.224	205	358.500	270,678	1.7

(1) FROM THE EAST CHICAGO WATER DEPARTMENT

(2) COMPUTED FROM SUSPENDED SOLIDS DETERMINATIONS OF RAW SEWAGE AND FINAL EFFLUENT. POUNDS VOLATILE COMPUTED BY USING PER CENT VOLATILE OF RAW SEWAGE.

(3) WASTE SLUDGE INCLUDED IN COMPUTING PRIMARY DETENTION PERIOD.

TABLE 3

CHARACTERISTICS OF RAW SEWAGE

MONTHS	TOTAL LBS SUSPENDED SOLIDS IN RAW SEWAGE	POUNDS SUSPENDED SOLIDS PER CAPITA DAILY	POUNDS B.O.D. PER CAPITA DAILY	POPULATION EQUIVALENT .17 POUNDS BOD/CAP/DAY	AVERAGE EQUIVALENT .17 POUNDS FAHRENHEIT
JANUARY	444,690	0.22	0.17	65,934	55
FEBRUARY	461,817	0.27	0.19	63,988	57
MARCH	369,317	0.20	0.18	59,029	57
APRIL	434,872	0.27	0.10	34,107	58
MAY	365,188	0.21	0.11	38,841	61
JUNE	228,096	0.13	0,11	41,725	64
JULY	215,531	0.16	0.15	54,088	71
AUGUST	259,997	0.15	0.16	45,209	72
SEPTEMBER	315,030	0.18	0.14	47,251	71
OCTOBER	482,732	0.27	0.20	66,646	66
NOVEMBER	378,480	0.22	0.15	49,319	61
DECEMBER	366,040	0.21	0.16	57,067	55
1964 AVERAGE	352,464	0.21	0.15	50,661	62
1962 AVERAGE	430,042	0.21	0.17	68,056	62
1961 AVERAGE	390,456	0.19	0.16	63,487	60
1960 AVERAGE	341.645	0.16	0.13	52,373	61
10 YEAR AVERAGE 1950-1959	380,045	0.19	0.16	67.183	62

TABLE 4

SETTLEABLE SOLIDS

MONTHS	RAW SEWAGE C.C.	PRIMARY EFFLUENT C.C.	PERCENT REMOVAL CLARIFIED TO RAW	FINAL EFFLUENT C.C.	PER CENT REMOVAL FINAL TO RAW
JANUARY	4.3	0.1	97.7	.005	99.9
FEBRUARY	7.4	0.4	94.6	.005	99.9
MARCH	6.0	0.5	91.7	.005	99.9
APRIL	5.2	0.5	90.4	.005	99.9
MAY	5.2	0.5	90.4	.005	99.9
JUNE	4.7	0.1	99.8	.005	99.9
JULY	4.3	0.1	97.2	.005	99.9
AUGUST	2.9	0.5	82.8	.005	00.8
SEPTEMBER	6.7	0.6	91.0	.005	99.9
OCTOBER	9.2	0.5	94.6	.005	99.9
NOVEMBER	6.7	0.5	92.5	.005	99.9
DECEMBER	5.1	0.5	90.2	.005	99.9
1964 AVERAGE	5.6	0.4	91.9	.005	99.9
1962 AVERAGE	5.4	0.1	97.1	.005	99.9
1961 AVERAGE	5.4	0.6	86.7	.005	99.9
1960 AVERAGE	2.6	0.5	76.8	.008	99.7
10 YEAR AVERAGE 1950-1959	3.1	1.4	56.2	.014	99.6

TABLE 5

SUSPENDED SOLIDS AND PER CENT ROMOVAL

MONTHS	RAW SEWAGE P.P.M	PRIMARY EFFLUENT P.P.M.	PER CENT REMOVAL PRIMARY TO RAW	FINAL EFFLUENT P.P.M.	PER CENT REMOVAL COMPLETE TREATMENT
JANUARY	160	54	66.3	8	95.0
FEBRUARY	208	68	67.3	10	95.1
MARCH	176	57	67.6	11	93.7
APRIL	130	49	623	10	92.3
MAY	113	53	53.0	5	95.6
JUNE	121	60	50.4	5	95.9
JULY	101	48	52.4	5	95.0
AUGUST	101	52	47.5	8	92.1
SEPTEMBER	141	60	57.4	8	94.3
OCTOBER	198	57	71.2	5	97.5
NOVEMBER	164	80	51.2	7	95.7
DECEMBER	128	51	60.1	7	94.5
1964 AVERAGE	144	58	58.2	7	94.7
1952 AVERAGE	165	53	67.1	6	96.4
1961 AVERAGE	145	55	62.3	8	94.2
10 YEAR AVERAGE 1950-1955	110	76	30.7	6	94.5

TABLE 6

MONTHS	RAW SEWAGE P.P.M	PRIMARY EFFLUENT P.P.M.	PER CENT REMOVAL PRIMARY TO RAW	FINAL EFFLUENT P.P.M.	PER CENT REMOVAL COMPLETE TREATMENT
JANUARY	124	61	50.0	19	84.7
FEBRUARY	140	70	50.0	13	87.1
MARCH	110	61	44.5	12	89.1
APRIL	52	32	38.5	8	84.6
MAY	59	28	52.5	6	89.8
JUNE	81	28	65.4	7	91.4
JULY	98	41	58.2	10	89.8
AUGUST	95	52	45.3	10	89.5
SEPTEMBER	112	53	52.7	17	84.8
OCTOBER	143	61	57.3	19	86.7
NOVEMBER	106	58	45.3	16	84.9
DECEMBER	114	71	37.7	16	85.9
1964 AVERAGE	101	50	49.8	13	87.6
1962 AVERAGE	135	66	51.1	15	87.9
1961 AVERAGE	124	64	47.5	18	86.8
1960 AVERAGE	91	76	16.5	11	86.6
10 YEAR AVERAGE	106	73	30.6	6	94.1

TABLE 7

PER CENT VOLATILE SUSPENDED SOLIDS

MONTHS	RAW SEWAGE	PRIMARY EFFLUENT	MIXED LIQUOR	RETURN SLUDGE
JANUARY	73	75	62	63
FEBRUARY	67	71	66	66
MARCH	72	69	69	68
APRIL	65	63	67	67
MAY	64	68	66	63
JUNE	68	69	64	64
JULY	72	62	65	64
AUGUST	73	74	65	64
SEPTEMBER	71	64	66	62
OCTOBER	76	77	73	71
NOVEMBER	71	65	67	67
DECEMBER	70	72	66	66
1964 AVERAGE	70	69	67	66
1962 AVERAGE	72	75	64	63
1961 AVERAGE	72	74	63	63
1960 AVERAGE	73	74	61	62
10 YEAR AVERAGE 1950-1959	74	72	66	65

TABLE 8

GRIT-SCREENINGS-SCUM

CUBIC FEET REMOVED

MONTHS	GRIT	SCREENINGS	SCUM
JANUARY	270	96	91
FEBRUARY	116	75	120
MARCH	60	321	222
APRIL	255	72	78
MAY	338	105	166
JUNE	310	51	132
JULY	358	108	156
AUGUST	14	189	156
SEPTEMBER	189	99	246
OCTOBER	136	81	174
NOVEMBER	183	120	120
DECEMBER	271	39	285
1963 TOTALS	2,500	1,356	1,956
1962 TOTALS	1.140	1,360	1,294
1961 TOTALS	2,030	1,157	1,129
1960 TOTALS	2,100	1,335	1,006
10 YEAR AVERAGE 1950-1959	3,006	1,853	2,114

GRUENDLER SEWAGE SHREDDERS IN OPERATION AT MAGOUN AVENUE PUMPING STATION THROUGHOUT 1959. ALDER STREET PUMPING STATION REMOVED MANUALLY.

TABLE 9

pH

MONTHS	RAW SEWAGE	PRIMARY EFFLUENT	MIXED LIQUOR	RETURN SLUDGE	FINAL EFFLUENT
JANUARY	7.6	7.6	7.3	7.2	7.5
FEBRUARY	7.4	7.6	7.3	7.2	7.4
MARCH	7.3	7.5	7.3	6.8	7.5
APRIL	7.4	7.6	7.3	7.1	7.5
MAY	7.4	7.6	7.4	7.2	7.6
JUNE	7.1	7.4	7.6	7.2	7.5
JULY	7.1	7.4	7.4	6.9	7.5
AUGUST	7.1	7.4	7.4	7.2	7.6
SEPTEMBER	7.0	7.3	7.2	7.0	7.0
OCTOBER	7.0	7.2	7.3	7.1	7.3
NOVEMBER	7.0	7.1	7.2	7.1	7.2
DECEMBER	7.4	7.5	7.2	7.1	7.3
1954 AVERAGE	7.2	7.4	7.3	7.1	7.4
1962 AVERAGE	7.5	7.4	7.2-	7.1	7.5
1961 AVERAGE	7.5	7.5	7.3	7.1	7.5
1960 AVERAGE	7.4	7.4	7.2	7.1	7.5
10 YEAR AVERAGE 1950-1959	7.4	7.4	7.2	7.1	7.3

TABLE 10

MIXED LIQUOR - RETURN SLUDGE DATA

	MIXED LIQUOR				RETURN SLUDGE		
MONTHS	SUSPENDED SOLIDS P.P.M.	SETTLEABLE SOLIDS 30-MINUTES	SLUDGE INDEX	WASTE SLUDGE M.G.D.	RETURN SLUDGE M.G.D.	SUSPENDED SOLIDS P.P.M.	PER CENT RETURN BY VOLUME
JANUARY	1961	120	61	0.082	3.175	7923	30
FEBRUARY	1372	136	101	1.73	3.821	4588	41
MARCH	1471	149	103	0.83	3.977	5366	35
APRIL	1570	130	85	0.42	4.043	6423	31
MAY	1597	145	93	0.25	4.052	6460	31
JUNE	1557	140	92	0.21	4.008	6285	38
JULY	1598	140	90	0.45	3.997	6226	39
AUGUST	1744	138	81	0.43	4.020	6906	43
SEPTEMBER	1967	144	74	1.01	3.950	10280	49
OCTOBER	1947	149	91	0.97	3.920	9599	42
NOVEMBER	1568	163	103	0.85	4.210	6363	45
DECEMBER	1584	148	95	0.79	4.104	5511	42
1964 AVERAGE	1634	144	92	0.72	4.020	6728	40
1962 AVERAGE	1901	137	75	0.07	3.751	7373	35
1961 AVERAGE	1851	127	69	0.06	3.140	8586	30
1960 AVERAGE	2195	123	61	0.13	3.939	9407	33
10 YEAR AVERAGE 1950-1959	1790	132	75	0.15	3.283	6991	25

TABLE 11

ABERATION DATA

MONTHS	SEWAGE FLOW THROUGH AERATORS M.G.D.	RETURN SLUDGE AERATORS M.G.D.	PER CENT RETURN SLUDGE BY VOLUME	WASTE SLUDGE TO PRIMARIES M.G.D.	AERATION DETENTION PERIOD HOURS	FINAL DETENTION PERIOD HOURS
JANUARY	13.9	3.175	22.8	.082	3.5	3.2
FEBRUARY	13.1	3.821	29.1	0.173	3.7	3.1
MARCH	15.1	3.977	26.3	0.800	3.2	2.5
APRIL	16.9	4.043	23.9	0.419	2.9	2.3
MAY	16.6	4.052	24.4	0.420	3.0	2.3
JUNE	14.5	4.808	27.6	0.440	3.4	3.0
JULY	14.5	3.997	27.6	0.453	3.4	2.9
AUGUST	13.7	4.020	29.3	0.430	3.6	3.1
SEPTEMBER	12.6	3.950	31.3	1.008	4.0	3.5
OCTOBER	13.4	3.920	29.3	0.965	3.7	3.1
NOVEMBER	13.7	4.210	30.7	0.853	3.6	3.1
DECEMBER	14.4	4.220	29.3	0.765	3.5	3.3
1964 AVERAGE	14.4	4.020	28.1	0.613	3.4	2.9
1962 AVERAGE	14.0	3.751	26.5	0.078	3.5	3.3
1961 AVERAGE	13.8	3.140	22.8	0.064	3.6	3.2
1960 AVERAGE	16.0	3.939	25.0	.132	3.1	2.9
10 YEAR AVERAGE 1950-1959	16.7	3.283	19.8	.159	3.0	2.6

TABLE 12

AIR CONSUPTION

MONTHS	AIR MILLION CUBIC FEET PER DAY	AIR CUBIC PER GALLON SEWAGE	D.O. AT END OF ABERATION P.P.M.	D.O. IN FINAL EFFLUENT P.P.M.
JANUARY	8.283	.77	1.3	2.5
FEBRUARY	8.844	.95	3.1	5.7
MARCH	8.682	.78	3.6	5.0
APRIL	8.611	1.50	1.6	5.1
MAY	8.585	1.46	1.7	4.9
JUNE	8.834	1.19	1.2	5.5
JULY	8.713	1.21	1.9	6.9
AUGUST	8.868	0.92	2.0	5.7
SEPTEMBER	8.652	1.00	1.9	9.1
OCTOBER	8.740	0.92	1.5	9.2
NOVEMBER	8.760	0.92	1.4	5.6
DECEMBER	8.568	0.84	2.3	5.6
1964 AVERAGE	8.713	1.06	1.9	6.2
1962 AVERAGE	8.867	.86	2.2	1.6
1961 AVERAGE	8.719	.83	3.1	3.9
1960 AVERAGE	8.595	..75	5.5	7.5
10 YEAR AVERAGE 1950-1959	7.376	.56	4.8	4.7

TABLE 13

COMMINUTORS

TOTAL HOURS IN OPERATION

MONTHS	COMMINUTOR NO. 1	COMMINUTOR NO. 2
JANUARY	744	744
FEBRUARY	696	696
MARCH	744	744
APRIL	720	720
MAY	744	744
JUNE	264	672
JULY	744	348
AUGUST	744	744
SEPTEMBER	720	720
OCTOBER	745	745
NOVEMBER	720	720
DECEMBER	744	744
1964 TOTALS	8329	8341
1962 TOTALS	5945	7607
1961 TOTALS	6002	4637
1960 TOTALS	8275	545
10 YEAR AVERAGE 1950-1959	5656	3567

TABLE 14

AIR BLOWERS
TOTAL HOURS IN OPERATION

MONTHS	NO. 1. AIR BLOWER	NO. 2. AIR BLOWER	NO. 3 AIR BLOWER	DIESEL ENGINE
JANUARY	250	427	123	123
FEBRUARY	168	168	112	472
MARCH	0	0	0	744
APRIL	0	0	0	720
MAY	0	0	0	648
JUNE	147	128	147	501
JULY	0	0	0	744
AUGUST	70	60	62	653
SEPTEMBER	0	0	0	720
OCTOBER	97	96	99	599
NOVEMBER	0	0	0	720
DECEMBER	80	95	31	674
1964 TOTALS	812	974	574	7318
1962 TOTALS	501	505	521	8030
1961 TOTALS	2634	2570	2678	4723
1960 TOTALS	2409	2607	2307	----
10 YEAR AVERAGE 1950-1959	5440	5201	5468	----

TABLE 15

RETURN SLUDGE PUMPS

TOTAL HOURS IN OPERATION

MONTHS	PUMP NO. 1.	PUMP NO. 2.	PUMP NO.3	PUMP NO. 4
JANUARY	744	744	24	744
FEBRUARY	696	622	74	695
MARCH	744	000	744	744
APRIL	720	000	720	720
MAY	744	000	744	744
JUNE	720	24	695	720
JULY	744	000	744	744
AUGUST	744	000	744	744
SEPTEMBER	576	144	720	720
OCTOBER	505	745	745	240
NOVEMBER	718	96	720	648
DECEMBER	744	000	744	744
1964 TOTALS	8399	2375	7419	8207
1962 TOTALS	8760	6633	7175	3442
1961 TOTALS	7154	6931	3076	8761
1960 TOTALS	8598	6303	4094	6637
10 YEAR AVERAGE 1950-1959	7024	5807	6536	6308

TABLE 16

DETRITOR AND CLEANING MECHANISM

TOTAL HOURS IN OPERATION

MONTHS	DETRITOR	CLEANING MECHANSIM
JANUARY	744	744
FEBRUARY	696	696
MARCH	744	744
APRIL	720	720
MAY	646	646
JUNE	471	471
JULY	425	425
AUGUST	121	121
SEPTEMBER	598	598
OCTOBER	665	665
NOVEMBER	691	691
DECEMBER	744	744
1964 TOTALS	7265	7265
1962 TOTALS	7265	7265
1961 TOTALS	7113	7112
1960 TOTALS	8058	8083
10 YEAR AVERAGE 1950-1959	5282	5281

TABLE 17

RAW SLUDGE TO DIGESTERS DATA

MONTHS	VOLUME 1000 GALLONS	DRY SOLIDS PER CENT	DRY SOLIDS 1000 LBS.	VOLATILE SOLIDS PER CENT	VOLATILE SOLIDS 1000 LBS.	pH
JANUARY	1237	4.5	388	61.7	240	6.5
FEBRUARY	1052	4.5	395	60.8	240	6.6
MARCH	1198	3.8	380	68.0	258	6.9
APRIL	987	3.6	296	57.6	170	7.1
MAY	1170	4.7	459	56.6	260	7.1
JUNE	1249	4.4	458	53.7	246	7.1
JULY	1425	3.8	452	55.0	247	7.2
AUGUST	1096	4.0	366	55.9	205	7.2
SEPTEMBER	512	4.0	171	59.5-	102	7.0
OCTOBER	615	3.0	200	62.6	125	7.1
NOVEMBER	716	3.8	227	66.4	151	7.1
DECEMBER	656	3.9	213	58.5	125	7.1
TOTALS	11913	---	3617	----	2129	---
1964 AVERAGE	993	4.0	329	59.5	194	7.0
1962 AVERAGE	1149	4.1	387	60.7	234	6.4
1961 AVERAGE	1109	3.6	334	62.2	207	6.3

TABLE 18

SLUDGE VACUUM FILTRATION DATA

MONTHS	GALLONS (1) FILTERED	SLUDGE (2) % SOL	%VOL	FILTER CAKE (2) % SOL	% MOIST	POUNDS SOLIDS (2) FILTERED	CHEMICAL DOSAGE (3) LIME	%	LBS FECL 3	%
JANUARY	177,224	----	---	---	---	----	25,350	----	3,925	---
FEBRUARY	898,010	----	---	---	---	----	137,350	----	27,825	---
MARCH	79,813	----	---	---	---	----	12,000	-----	1,850	---
APRIL	-------	----	---	---	---	----	------	----	-----	---
MAY	-------	----	---	---	---	----	-------	----	-----	---
JUNE	-------	----	---	---	---	----	-------	----	-----	---
JULY	-------	----	---	---	---	----	-------	----	-----	---
AUGUST	-------	----	---	---	---	----	-------	----	-----	---
SEPTEMBER	-------	----	---	---	---	----	-------	----	-----	---
OCTOBER	-------	----	---	---	---	----	-------	----	-----	---
NOVEMBER	-------	----	---	---	---	----	-------	----	-----	---
DECEMBER	-------	----	---	---	---	----	-------	----	-----	---
TOTAL	1,155,047	----	---	---	---	----	174,700	---	----	---
1962 AVE,	198,886	7.0	47	23	77	117,966	26,551	22.3	6,049	5.2
1961 AVE.	319.683	7.3	46	22	78	178,708	44,970	22.6	9,800	5.0

(1) METER READINGS (2) LABORATORY ANALYSIS (3) TOTAL LBS + LBS. SOLIDS FILTERED

TABLE 19

GAS ENGINE OPERATION

MONTHS	HOURS IN OPERATION	CU. FT. GAS CONSUMED	GAL OIL CONSUMES	AIR BLOWN 1000's CUBIC FEET OF AIR	FUEL COMSUMED PER 1000 CU. FT.AIR	
					GAL. OIL.	CU.FT.GAS
JANUARY	334	493,900	1,219	129,762	.01	3.80
FEBRUARY	408	-------	-----	145,639	---	----
MARCH	744	-------	7,607	269,132	.02	----
APRIL	720	25,200	5,634	365,173	.01	0.63
MAY	407	277,00	2,246	136,638	.02	2.03
JUNE	496	317,010	2,535	178,740	.02	1.78
JULY	744	200,700	5,275	270,003	.02	0.75
AUGUST	649	-------	5,801	237,910	.02	----
SEPTEMBER	720	-------	6,558	259,405	.02	----
OCTOBER	600	--------	5,290	218,817	.02	----
NOVEMBER	552	179,400	5,965	263,064	.02	0.58
DECEMBER	659	-------	6,512	248,888	.02	----
1964 TOTAL	7,133	1,493,201	59,026	2,723,171	---	----
1962 TOTAL	8,030	4,422,100	68,775	2,706,513	---	----
1961 TOTAL	4,769	2,802,349	34,355	1,623,600	---	----
MAXIMUM	744	743,300	8,148	299,922	.02	3.80
MINIMUM	298	0	1,692	107,145	.01	0.58

TABLE 20

SUMMARY SHOWING MONTHLY SALARY AND PAYROLL DISTRIBUTION

MONTHS	SEWRAGE TREATMENT PLANT	GENERAL MAINTENANCE	SEWER DIVISION	ALDER AVENUE PUMPING STATION	TOTALS
JANUARY	4,000.00	9,218.92	5,727.83	1,781,24	20,727.99
FEBRUARY	3,750.00	11,215.92	7,759.97	1,900.00	24,625.89
MARCH	4,324.75	11,564.01	7,450.81	1,900.00	25,239.57
APRIL	4,000.00	11,689.75	8,425.30	1,900.00	26,015.05
MAY	4,000.00	11,433.41	8,494.69	1,900.00	25,828.10
JUNE	5,526.05	13,349.15	12,605.56	2,398.08-	33,878.82
JULY	4,991.12	11,801.37	9,340.82	2,294.35	28,427.66
AUGUST	5,141.68	11,203.37	8,570.83	1,900.00	26,815.88
SEPTEMBER	5,227.44	12,230.73	8,588.32	1,900.00	27.946.49
OCTOBER	4,555.50	11,405.43	8,074.93	1,900.00	25,935.86
NOVMEBER	4,643.20	13,039.41	7,581.12	1,900.00	27,163.73
DECEMBER	4,773.85	15,593.66	8,911.35	1,900.00	31,178.86
1964 TOTALS	54,933.59	143,745.11	101,531.53	23,573.67	323,783.90
1962 TOTALS	180,973.59	----------	107,559.38-	22,500.00	311,032.97

TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER - ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

TABLE 21

SUMMARY SHOWING OTHER UTILITY COSTS (1)

MONTHS	SEWAGE TREATMENT PLANT	ALDER STREET PUMPING STATION*	MAGOUN AVENUE PUMPING STATION	MICHIGAN AVENUE PUMPING STATION	REMOTE (2) METERING CHANNEL SERVICES	TOTALS
JANUARY	$ 1,105.53	9.41	6.41	1.70	23.62	1,146.67
FEBRUARY	1,097.67	9.94	6.41	1.70	23,62	1,139.34
MARCH	1,377.52	9.41	6.41	1.70	23.62	1,418.66
APRIL	2,146.87	28.28	17.13	1.70	23.62	2,217.60
MAY	278.98	43.50	27.47	24.37	23.62	397.94
JUNE	269.86	22.81	17.55	14.45	23.62	348.29
JULY	631.84	26.38	21.85	14.45	23.62	718.14
AUGUST	520.40	23.88	19.16	14,45	23.62	601.51
SEPTEMBER	555.90	25.15	19.16	14.45	23.62	638.28
OCTOBER	597.97	26.19	19.16	14.45	23.62	681.39
NOVEMBER	573.00	25.38	19.16	14.45	23.62	655.61
DECEMBER	1,042.54	25.99	19.16	14.45	23.62	1,125.76
[illegible]	10,[illegible].08	276.32	199.03	132.32	283.44	11,089.19
1962	4,138.75	384.23	203.70	151.73	307.06	5,185.47

(1) TELEPHONE AND TELEGRAPH, REMOTE METERING CIRCUIT, GAS AND WATER.

(2) INCLUDES SERVICES TO MARKSTOWN, MICHIGAN AVENUE, CANAL STREET, AND ROXANNA. PUMP STATION.

* TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER- ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

TABLE 22

SUMMARY SHOWING MONTHLY FUEL OIL COSTS

MONTHS	SEWAGE TREATMENT PLANT	ALDER STREET PUMPING STATION	MAGOUN AVENUE PUMPING STATION	TOTALS
JANUARY	$ 561.35	466.92	196.80	1,225.07
FEBRUARY	459,42	------	85.32	524.74
MARCH	817.60	356.00	------	1,175.60
APRIL	841.26	------	------	943.97
MAY	400.00	------	------	400.00
JUNE	450.00	------	------	450.00
JULY	400.00	------	------	400.00
AUGUST	700.00	------	------	700.00
SEPTEMBER	400.00	------	------	400.00
OCTOBER	700.00	------	------	700.00
NOVEMBER	400.00	222.50	------	622.50
DECEMBER	846.98	712.00	------	1,558.98
1964 TOTALS	6,956.61	1,757.42	384.83	9,098.86
1962 TOTALS	8,309.94	1,400.34	661.91	10,372.19

TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER - ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT OF THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

TABLE 23

SUMMARY SHOWING ELECTRIC POWER COSTS

MONTHS	SEWAGE TREAT-MENT PLANT	ALDER STREET PUMPING STATION	MAGOUN AVENUE PUMPING STATION	CANAL STREET PUMPING STATION	MARKTOWN PUMPING STATION	ROXANNA PUMPING STATION	TOLL ROAD PUMPING STATION	MICHIGAN AVENUE PUMPING STATION	TOTALS
JANUARY	912.91	-------	396.25	111.60	47.70	89.00	36.58	512.50	2,106.54
FEBRUARY	1,708.70	3,586.00	612.00	146.30	48.05	117.00	55.05	512.50	6,785.60
MARCH	1,995.31	1,276.40	648.00	120.23	44.75	102.00	53.55	512.50	4,752.74
APRIL	1,976.24	2,750.40	1,764.00	336.48	82.38	492.00	148.58	1,088.50	8,638.58
MAY	1,571.98	1,458.80	576.00	89.55	20.00	95.00	35.00	512.50	4,358.58
JUNE	1,477.96	1,230.80	396.25	102.28	20.38	58 00	35.00	512.50	3.833.17
JULY	949.54	1,276.40	611.52	96.50	20.00	53.00	35.00	512.50	3,554.46
AUGUST	1,147.68	1,291.60	324.24	87.88	20.00	52.50	35.00	512.50	3,471.40
SEPTEMBER	876.64	1,458.80	576.00	93.78	20.00	62.00	35.00	512.50	3,634.72
OCTOBER	1,248.91	1,291.60	396.00	79.23	20.00	52.50	35.00	512.50	3,635.74
NOVEMBER	905.05	1,200.40	468.00	129.98	20.00	96.00	35.00	614.88	3,469.31
DECEMBER	1,333.01	1,218.00	504.12	100.39	34.81	84.50	45.81	512.50	3,833.14
1964	16,103.93	18,039.20	7,272.38	1,494.20	398.07	1,353.50	584.57	7,716.12	52,074.23
1962	14.822.64	16.724.00	6,804.50	1.318.39	294.29	878.00	499.93	6,755.50	46,097.25

TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY AND STORM WATER - ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TABLE 24

SUMMARY SHOWING MONTHLY CHEMICAL COSTS

MONTHS	ALUMINUM SULFATE	LIME	FERRIC CHLORIDE	LIQUID CHLORINE	MURIATIC ACID	TOTALS
JANUARY	----	968.25	2,676.23	----	8	3,644.48
FEBRUARY	960.00	896.00	--------	----	7.50	1,863.50
MARCH	----	------	--------	----	----	--------
APRIL	----	------	--------	----	82.50	82.50
MAY	----	------	--------	----	----	--------
JUNE	----	------	--------	274.80	----	274.80
JULY	----	------	--------	----	----	--------
AUGUST	----	------	--------	274.80	----	274.80
SEPTEMBER	----	------	--------	----	----	--------
OCTOBER	----	------	--------	412.20	----	412.20
NOVEMBER	----	------	--------	----	----	--------
DECEMBER	----	------	--------	----	----	--------
1964 TOTALS	960.00	1,864.25	2,676.23	961.80	90.00	6,552.28
1963 TOTALS	4,014.00	3,247.50	5,781.06	460.00	3.38	13,505.94

TABLE 25

BUDGET FOR 1964*

BUDGET CLASSIFICATION
FOR
DEPARTMENT OF PUBLIC SANITATION

SANITARY MAINTENANCE AND GENERAL EXPENSE FUND		
PERSONAL SERVICES		$ 339,417.60
CONTRACTUAL SERVICES		189,785.00
SUPPLIES		32,750.00
MATERIALS		11,200.00
CURRENT CHARGES		25,675.00
PROPERTIES		7,000.00
	TOTAL	$ 605,827.60
SANITARY DISTRIST BOND FUND		
CURRENT OBLIGATION		$ 355,855.00
DEBT PAYMENTS		574,000.00
	TOTAL	$ 929,855.00
GRAND TOTAL -- ALL FUNDS		$1,535,682.60

* TRANSFER OF THE JURISDICTION OF THE BUREAU OF PUMPING STATIONS TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1953. THE OPERATION AND MAINTENANCE OF ALL PUMPING STATIONS - SANITARY WATER-ASSUMED BY THE SANITARY DISTRICT AS OF JANUARY 1, 1953.

TRANSFER OF THE JURISDICTION OF THE SEWER DEPARTMENT TO THE BOARD OF SANITARY COMMISSIONERS EFFECTED JANUARY 1, 1961. THE CONSTRUCTION, MAINTENANCE AND REPAIR OF ALL CITY SEWERS. ASSUMED BY THE SANITARY DISTRICT JANUARY 1, 1961.

EAST CHICAGO SANITARY DISTRICT

5200 Indianapolis Blvd.
East Chicago, Indiana 46312

Dr. John B. Nicosia
Mayor

Cornel A. Leahu
Superintendent

February 26, 1965

Conference Regarding Water Pollution
In the Calumet District March 2, 1965.

Honorable Gentlemen:

In retrospect to the previous statistical data, I wish to bring forth this additional information.

The dissolved oxygen demand of the East Chicago Municipal Sanitary District effluent, as discharged into the Grand Calumet River and the Lake Michigan Basin, is on the average for the year 1964, 3,163 in population equivalent (PE).

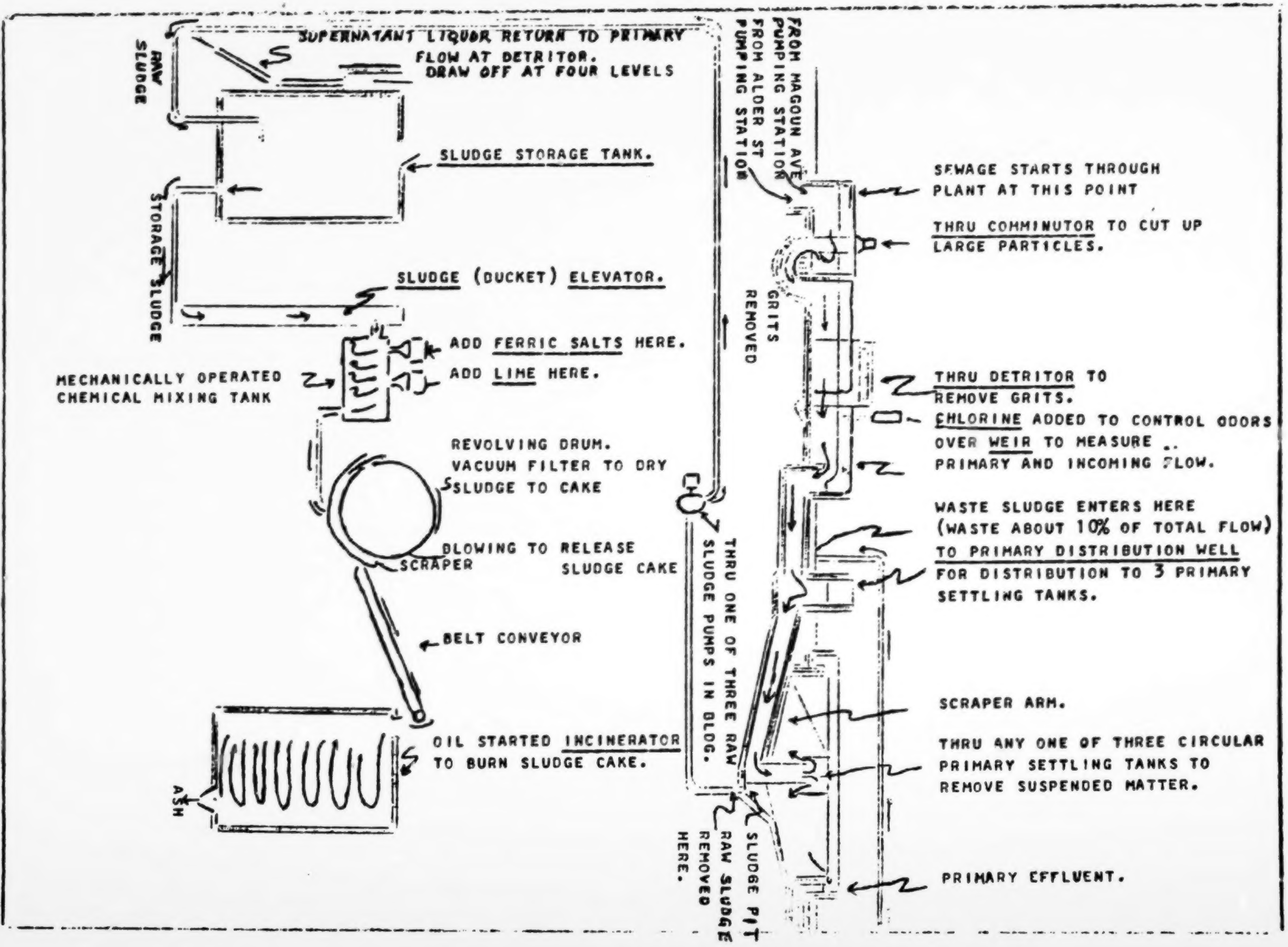
The average coliform density of the East Chicago Municipal Sanitary District sewage treatment plant effluent, as documented by impartial laboratory analysis of the Gary-Hobart Water Corporation, discharged into the Grand Calumet River and the Lake Michigan Basin, was, for the month of February 1965, in the order of 7.2 per 100 ml. Bacterial disinfection of this magnitude indicates an extremely successful treatment process.

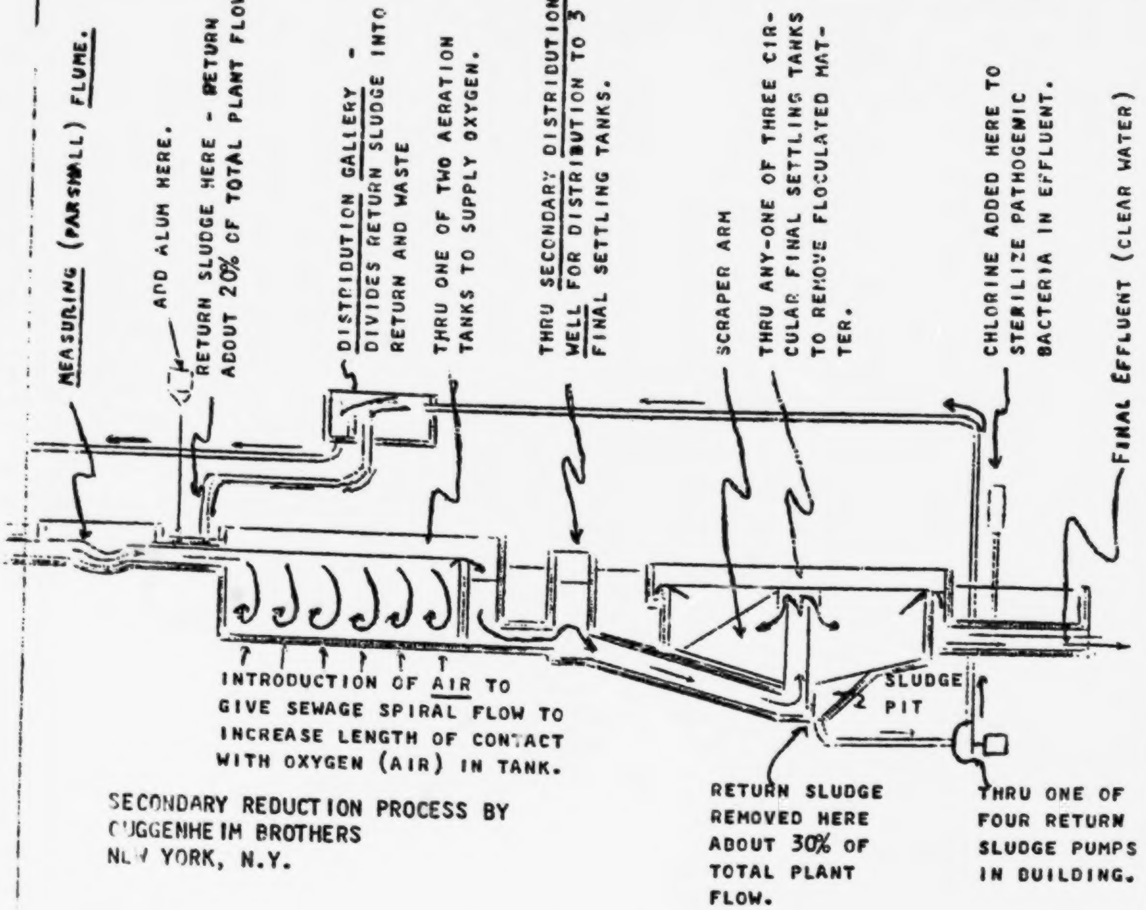
The Sanitary District, at the behest of our tireless Mayor, Dr. John B. Nicosia, is presently studying feasibility reports and negotiating with industry the possibility of diverting industrial wastes (phenolics, ammonia, nitrates, nitrites, cyanide, to the District for final treatment. Studies at present indicate this may be accomplished by settling in a deep lagoon, aerating and chlorinating, prior to discharge into the Grand Calumet River and the Lake Michigan Basin.

This report and statistical data and the Sanitary District of the City of East Chicago, Indiana, is hereby respectfully submitted to the Honorable Dr. John B. Nicosia, Mayor, The Sanitary Commissioners, Honorable Secretary Anthony J. Celebrezze of the Department of Health, Education, and Welfare, Honorable Murray Stein, Chairman of the conference, and the Indiana State Board of Health, this 2nd day of March, 1965.

/S/ Cornel A. Leahu, Superintendent
East Chicago Sanitary District

(Text continued on Page 908)


SUPERNATANT LIQUOR RETURN TO PRIMARY FLOW AT DETRITOR.
DRAW OFF AT FOUR LEVELS
RAW SLUDGE
SLUDGE STORAGE TANK.
STORAGE SLUDGE
SLUDGE (BUCKET) ELEVATOR.
ADD FERRIC SALTS HERE.
ADD LIME HERE.
MECHANICALLY OPERATED CHEMICAL MIXING TANK
REVOLVING DRUM. VACUUM FILTER TO DRY SLUDGE TO CAKE
BLOWING TO RELEASE SLUDGE CAKE
SCRAPER
BELT CONVEYOR
OIL STARTED INCINERATOR TO BURN SLUDGE CAKE.
ASH
FROM MAGOUN AVE PUMPING STATION
FROM ALDER ST PUMPING STATION
GRITS REMOVED
THRU ONE OF THREE RAW SLUDGE PUMPS IN BLDG.
SLUDGE PIT
RAW SLUDGE REMOVED HERE.
SEWAGE STARTS THROUGH PLANT AT THIS POINT
THRU COMMINUTOR TO CUT UP LARGE PARTICLES.
THRU DETRITOR TO REMOVE GRITS.
CHLORINE ADDED TO CONTROL ODORS
OVER WEIR TO MEASURE PRIMARY AND INCOMING FLOW.
WASTE SLUDGE ENTERS HERE (WASTE ABOUT 10% OF TOTAL FLOW)
TO PRIMARY DISTRIBUTION WELL FOR DISTRIBUTION TO 3 PRIMARY SETTLING TANKS.
SCRAPER ARM.
THRU ANY ONE OF THREE CIRCULAR PRIMARY SETTLING TANKS TO REMOVE SUSPENDED MATTER.
PRIMARY EFFLUENT.


MEASURING (PARSHALL) FLUME.
ADD ALUM HERE.
RETURN SLUDGE HERE - RETURN ABOUT 20% OF TOTAL PLANT FLOW.
DISTRIBUTION GALLERY - DIVIDES RETURN SLUDGE INTO RETURN AND WASTE
THRU ONE OF TWO AERATION TANKS TO SUPPLY OXYGEN.
THRU SECONDARY DISTRIBUTION WELL FOR DISTRIBUTION TO 3 FINAL SETTLING TANKS.
SCRAPER ARM
THRU ANY-ONE OF THREE CIRCULAR FINAL SETTLING TANKS TO REMOVE FLOCULATED MATTER.
CHLORINE ADDED HERE TO STERILIZE PATHOGENIC BACTERIA IN EFFLUENT.
FINAL EFFLUENT (CLEAR WATER)
SLUDGE PIT
INTRODUCTION OF AIR TO GIVE SEWAGE SPIRAL FLOW TO INCREASE LENGTH OF CONTACT WITH OXYGEN (AIR) IN TANK.
RETURN SLUDGE REMOVED HERE ABOUT 30% OF TOTAL PLANT FLOW.
THRU ONE OF FOUR RETURN SLUDGE PUMPS IN BUILDING.

SECONDARY REDUCTION PROCESS BY
GUGGENHEIM BROTHERS
NEW YORK, N.Y.

SCHEMATIC CROSS-SECTION OF
SEWAGE TREATMENT PLANT
EAST CHICAGO, INDIANA
HON. DR. JOHN B. NICOSIA
MAYOR
CORNEL A. LEAHU, SUPERINTENDENT

SANITARY DISTRICT BOARD
OF
COMMISSIONERS

PETER E. AUKSEL
AMERIGO G. GIANNINI
CARLOS BORGE
MARTIN A. KARR, ESQ.
ATTORNEY

A

MONTHLY REPORT OF O
EAST CHICAGO, INDIANA SEWAGE
GUGGENHEIM BIOCHEMICAL TRE

CORNEL A. LE AHU. SUPERINTENDENT

ANNALYTICAL DATA

SOLIDS

DIGESTER DAT

PERCENT VOLATILE		SUSPENDED SOLIDS P.P.M.				MIXED LIQUOR				RETURN SLUDGE		DISSOLVED OXYGEN		PERCENT SOLIDS DIGESTER SLUDGE				pH DIGESTER SLUDGE		
RAW	PRIMARY	RAW	PRIMARY	FINAL	SPRNTN. AVG.	SUSPENDED SOLIDS P.P.M.	PERCENT VOLATILE	SET TEST 30 MIN.	SLUDGE INDEX	SUSPENDED SOLIDS P.P.M.	PERCENT VOLATILE	AERATION	FINAL	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 2	NO. 3
60	85	190	151	20		1652	62	140	84	4960	70	5.2	7.4							
66	64	348	88	14		1288	64	120	93	4220	61	2.8	7.6							
																		6.8		
64	87	168	48	7		1220	68	115	94	4270	66	0.8	5.2	4.1				6.7		
65	98	265	95	8		1396	67	130	93	3220	68	0.6	4.8	4.9				6.9		
68	63	131	64	8		1112	31	110	99	3410	66	2.8	5.8	4.9				6.9		
71	71	124	72	6		980	69	110	112	4760	69	3.6	5.4	4.5						
60	57	135	47	7		1376	69	150	109	4700	69	3.0	5.6	7.7						
59	67	193	36	8		1304	70	150	115	4170	70	7.0	6.0	4.3				6.1		
84	67	154	62	5		1284	69	150	117	4050	69	1.4	5.2	3.9				7.0		
65	75	300	72	8		1332	72	130	98	4430	59	2.2	5.2	4.9						
																		6.8		
63	71	284	80	11		1564	61	130	83	5370	69	4.8	6.2	4.2				6.6		
73	64	286	70	10		1384	71	140	101	4140	70	5.0	5.6	4.6						
																		6.4		
70	75	206	67	10		1584	72	140	88	4930	69	2.8	4.6	4.2				6.8		
68	74	278	61	23		2040	69	140	69	7660	42	2.6	4.8	3.8				6.6		
72	61	213	54	6		1512	71	150	99	3020	71	3.4	5.8	4.2				6.3		
47	67	192	57	3		1152	71	140	122	4250	71	2.0	6.0	3.9						
63	70	176	44	16		1172	51	155	132	4960	65	1.8	5.4	4.0				6.1		
64	60	198	43	8		1360	69	145	107	5450	69	3.2	6.4	4.9				6.2		
72	72	113	57	6		1352	68	135	100	5200	67	3.0	6.4	3.1				6.3		
62	63	208	68	10		1372	66	136	101	4588	63	3.1	5.7	4.5				6.6		

REMARKS

B

895

PORT OF OPERATION
A SEWAGE TREATMENT PLANT
BIOCHEMICAL TREATMENT

FEBRUARY
MONTH
1964
YEAR

MICHAEL J. KMAK, ASSISTANT SUPERINTENDENT

		DIGESTER DATA												ACIDS			
OLIDS		pH				PERCENT VOLATILE				SUSPENDED SOLIDS P.P.M.				VOLATILE			GAS
LUDGE		DIGESTER SLUDGE				DIGESTER SLUDGE				SUPERNATANTS				P.P.M.			ANALYSIS
NO. 3	NO. 4	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 3	NO. 4	% CO_2
		6.8												370			
		6.7															
		6.9				55								290			
		6.9				59								420			
						57								290			
						52								390			
						71								520			
		6.1				73								620			
		7.0				61								480			
		6.8				78								300			
						71											
		6.6				70								420			
						6											
		6.4				62											
		6.8				62								590			
		6.6				85								930			
		6.3				67								1190			
						63								1480			
		6.1				74								1750			
		6.2				52								1860			
		6.3				50								2290			
		6.6				65								832			

1A

MONTHLY REPORT OF OP
EAST CHICAGO, INDIANA SEWAGE
GUGGENHEIM BIOCHEMICAL TREATM

CORNEL A. LEAHU SUPERINTENDENT

DATE	DAY OF THE WEEK	WEATHER			GENERAL INFORMATION		GRIT CHAMBER		PRIMARY SETTLING			AERATION					FINAL SETT'LG	SLUD		
														AIR USED						
		TEMP. F MAX.	TEMP. F – MIN.	PRECIPITATION INCHES	RECTANGULAR WEIR M.G.D.	TEMPERATURE OF SEWAGE – F	SCREENINGS RMVD. CU. FT.	GRIT RMVD. CU. FT.	CLEANING MECHANISM HRS	SLUDGE DRAWN TIMES PER DAY	DETENTION HOURS	RETURN SLUDGE M.G.D.	WASTE SLUDGE M.G.D.	MILLION CUBIC FEET	CU FT PER GALLON OF SEWAGE	AERATION PERIOD HRS	DETENTION HOURS	TO DIGESTERS GAL X 1000	TO DIGESTERS LBS VOL SOLIDS X 1000	GAS PRODUCTION
1	SAT				9.282	58			24	6	2.45	3.922	1.27	9.464	1.02	3.98	3.13	41.2		
2	SUN				8.447	58			24	6	2.73	4.085	0.00	9.501	1.12	3.90	2.32			
3	MON				8.782	58	12	27	24	6	2.58	3.90[illegible]	1.51	9.518	1.08	3.81	3.30			
4	TUE				9.297	58			24	4	2.60	4.085	0.48	9.598	1.03	3.91	3.13			
5	WED				8.726	58			24	6	2.55	3.824	2.38	9.533	1.09	3.82	3.32	42.9		
6	THR				8.750	58			24	5	2.62	3.911	1.00	9.036	1.03	3.83	3.31			
7	FRI				9.200	58		14	24	6	2.49	3.927	0.42	9.323	1.01	3.71	3.32	47.5		
8	SAT				8.785	58			24	6	2.59	4.073	1.08	9.519	1.08	3.77	3.33	53.5		
9	SUN				9.150	58			24	6	2.50	3.953	0.37	9.260	1.10	3.71	3.19			
10	MON				8.500	58	36		24	4	2.67	3.919	1.32	9.384	0.97	3.91	3.26	49.6		
11	TUE				8.750	58			24	6	2.66	3.790	1.01	8.470	0.98	3.86	3.32	48.1		
12	WED				8.830	58			24	3	2.59	3.991	0.57	8.240	0.93	3.79	3.29	42.1		
13	THR				8.640	58			24	5	2.62	3.890	1.59	8.490	0.93	3.77	3.29	42.1		
14	FRI				8.850	58		27	24	5	2.58	3.956	0.85	8.540	1.01	3.64	3.28	31.8		
15	SAT				9.050	56			24	5	2.57	3.946	0.45	8.410	0.87	4.00	3.21	49.6		
16	SUN				9.100	56			24	5	2.49	4.012	1.57	8.453	0.86	3.57	3.19			
17	MON				8.267	56	15		24	4	2.66	3.880	0.69	8.379	0.89	3.55	3.52			
18	TUE				9.615	56			24	6	2.39	3.760	0.00	8.380	0.89	3.57	302	47.7		
19	WED				9.707	56			24	5	2.49	3.950	0.86	8.352	0.85	3.80	3.00	58.7		
20	THR				9.652	56			24	5	2.37	3.944	0.68	8.593	0.99	380	3.01	50.8		
21	FRI				9.640	56		30	24	5	2.38	3.991	0.43	9.156	0.99	3.52	3.01	49.5		
22	SAT				9.786	56			24	6	2.60	4.019	0.52	8.720	1.03	3.62	3.30			
23	SUN				8.820	58			24	5	2.60	3.994	0.61	9.135	0.93	3.62	3.29			
24	MON				9.820	58	12		24	5	2.34	4.016	0.45	9.109	0.90	3.26	296	41.4		
25	TUE				9.510	58			24	5	2.41	3.926	0.49	8.606	0.76	3.32	3.06	48.5		
26	WED				11.088	58			24	5	2.00	3.985	0.43	8.450	0.78	3.30	2.62	56.0		
27	THR				10.689	58			24	4	2.15	3.988	0.42	8.300	0.76	3.29	2.72	56.1		
28	FRI				10.792	58		18	24	6	2.11	3.944	1.24	8.267	0.77	3.39	2.69	62.2		
29	SAT				10.610	56			24	6	2.17	3.975	0.41	8.299	0.78	3.57	2.74	63.3		
					270.135		75	116	696			114.558	23.10	256.48			9003	951.6		
					9.315	57	3	4	24	5	2.48	3.950	0.86	8.844	0.95	3.68	3.10	47.6		

GENERAL INFORMATION

AVERAGE B.O.D. – RAW 10,878 LBS. ÷ 0.17 63,988 EQUIVALENT POPULATION

AVERAGE S.S. REMOVED 15,385 LBS. PER DAY

GAS UTILIZED DURING MONTH ____ THOUSAND CUBIC FEET

VALUE OF GAS UTILIZED ____

CONNECTED POPULATION 64,800

PAYROLL
ELECTRICITY
OTHER UTILIT
CHEMICALS
OTHER OPER
TOTAL

B

ORT OF OPERATION
SEWAGE TREATMENT PLANT
CHEMICAL TREATMENT

FEBRUARY
MONTH

1964
YEAR

MICHAEL J. KMAK, ASSISTANT SUPERINTENDENT

	FINAL SET'L'G	SLUDGE DISPOSAL							CHEMICALS				ANALYTICAL DATA							
									SLUDGE CONDT.		SEWAGE TREATMENT		pH					5 DAY B.O.D.		
AERATION PERIOD HRS.	DETENTION HOURS	TO DIGESTERS GAL X 1000	TO DIGESTERS LBS VOL SOLIDS X 1000	GAS PRODUCTION CU. FT X 1000	GAS CU FT PER LB. VOL ADDED	TO BED OR FILTER GAL. X 1000	INCINERATOR HOURS	BED SLUDGE OR CAKE RMVD TONS	LIME	IRON	ALUM	LIME	RAW	PRIMARY	MIXED LIQUOR	RETURN SLUDGE	FINAL	RAW	PRIMARY	FINAL
3.98	3.13	41.2				58.5		38.3	7850	1350	400									
3.90	2.32					46.7		31.5	5550	1300	400		7.6	7.8	7.3	7.1	7.6	52	68	39
3.81	3.30					41.6		29.3	5500	925	400		7.4	7.8	7.2	7.8	7.4	161	65	18
3.91	3.13					36.0		24.8	4550	750	400									
3.82	3.32	42.9				56.2		38.3	7950	1185	400		7.6	7.6	7.2	7.1	7.4	156	44	17
3.83	3.31					39.8		29.3	6100	1140	400		7.4	7.8	7.3	7.1	7.5	237	116	19
3.71	3.32	47.5				70.0		49.5	9750	1550	400		7.3	7.6	7.0	6.9	7.2			
3.77	3.33	53.5				67.6		47.3	10500	1900	400									
3.71	3.19					63.9		38.3	9250	1600	400		7.4	7.3	7.5	7.1	7.3	145	90	14
3.91	3.26	49.6				63.0		38.3	9300	1680	400		7.2	7.0	6.8	6.7	7.0	65	82	14
3.86	3.32	48.1				63.0		31.5	8250	1470	400		6.9	7.5	7.0	6.9	7.1	191	31	15
3.79	3.29	42.1				23.4		18.0	4250	715	400		7.4	7.7	7.4	7.2	7.5	76	64	17
3.77	3.29	42.1									400		7.4	7.4	7.1	7.0	7.3	104	64	14
3.64	3.28	31.8									000									
4.00	3.21	48.6									000									
3.57	3.19										400		7.4	7.4	7.2	7.0	7.4	117	52	17
3.55	3.52										400		7.4	7.4	7.2	7.0	7.4	210	83	16
3.57	3.02	47.7									400		7.6	7.6	7.4	7.4	7.5	98	60	18
3.80	3.00	58.7									400		7.5	7.5	7.4	7.4	7.5	198	81	17
3.80	3.01	50.8									400		7.5	7.5	7.5	7.3	7.4	207	77	18
3.52	3.01	49.5									400									
3.62	3.30										400									
3.62	3.29										400		7.5	7.5	7.3	7.1	7.5	194	59	12
3.26	2.96	41.4									400		7.6	7.7	7.4	7.1	7.6	182	96	18
3.32	3.06	48.5				57.0		42.8	9250	1450	400		7.7	8.1	7.4	7.2	7.6	138	64	17
3.30	2.62	56.0				56.4		42.8	10700	1710	400		7.3	8.0	7.5	7.1	7.6	155	65	18
3.29	2.72	56.1				55.1		36.0	10500	1602	400		7.8	8.1	7.9	7.6	7.9	173	69	18
3.39	2.69	62.2				55.3		36.0	9450	1533	400									
3.57	2.74	63.3				53.1		33.8	8750	1500	400									
	90.03	951.6				906.0		605.8	137350	2360	10800									
3.68	3.10	47.6				53.3		35.6	8079	1374	400		7.4	7.6	7.3	7.2	7.4	140	70	18

PAYROLL	15,195.92
ELECTRICITY PURCHASED	1,708.70
OTHER UTILITIES	1,279.60
CHEMICALS	1,609.50
OTHER OPERATING COSTS	7,708.04
TOTAL	27,501.76

% PURIFICATION

TREATMENT	B.O.D.	S.S.
PRIMARY	50	67
SECONDARY	37	28
OVERALL	87	95

A

MONTHLY REPORT OF O
EAST CHICAGO, INDIANA SEWAGE
GUGGENHEIM BIOCHEMICAL TREA

CORNEL A. LEAHU SUPERINTENDENT

ANNALYTICAL DATA														DIGESTER DAT						
SOLIDS												DISSOLVED OXYGEN		PERCENT SOLIDS				pH		
PERCENT VOLATILE		SUSPENDED SOLIDS P.P.M.				MIXED LIQUOR				RETURN SLUDGE				DIGESTER SLUDGE				DIGESTER SLUD		
RAW	PRIMARY	RAW	PRIMARY	FINAL	SPRNTNT AVG	SUSPENDED SOLIDS P.P.M.	PERCENT VOLATILE	SET TEST 30 MIN	SLUDGE INDEX	SUSPENDED SOLIDS P.P.M.	PERCENT VOLATILE	AERATION	FINAL	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 2	NO. 3
80	74	66	31	3		1460	72	150	103	4690	70	3.0	5.8	3.2				6.4		
70	63	123	62	3		1244	71	135	108	4520	72	1.6	6.2	1.9				6.1		
75	78	196	67	5		1388	73	160	115	5310	68	1.0	5.6	3.7				6.4		
64	60	460	95	10		1092	71	130	119	5740	71	4.4	50	5.5				6.4		
72	64	745	84	30		3052	52	270	88	5700	70	1.6	50	7.3				6.6		
60	50	68	52	8		1564	64	150	96	9360	63	1.8	5.6	5.6				6.8		
69	86	195	58	9		1348	74	145	107	6600	68	3.4	5.8	5.6				7.3		
62	54	156	54	13		1632	64	150	92	4890	62	3.4	5.8	7.1				7.1		
65	69	171	53	17		1500	66	140	93	5150	72	3.4	5.6	4.0				6.8		
70	65	160	40	21		1448	65	140	97	5420	64	3.4	0.8	3.2				7.0		
79	75	174	40	11		1520	66	150	99	4900	64	3.8	5.6	3.0				7.0		
74	71	86	45	14		1064	68	155	146	3460	65	4.0	4.6	3.2				7.1		7.2
76	31	86	83	11		1252	66	150	119	4330	68	3.2	4.0	4.9				7.2		7.3
70	72	92	47	9		1540	66	140	91	4960	78	1.2	3.8	3.3				7.1		7.0
87	77	69	35	6		1360	68	150	110	5470	67	2.4	3.8	2.9				7.2		7.1
69	72	59	47	7		1388	79	150	109	3990	68	3.4	5.4	2.0				7.0		7.1
85	84	146	43	8		1300	74	140	108	4890	74	4.2	6.8	2.0				6.9		7.1
75	84	170	63	14		1304	69	140	107	5230	68	4.8	5.6	2.3				6.9		7.0
58	52	145	113	19		1464	65	140	96	7830	64	4.0	5.2							
68	67	137	49	12		1476	65	130	88	4400	64	3.2	5.8			2.7		6.8		6.9
75	75	222	40	8		1564	70	150	96	5380	67	4.2	5.4	3.5				7.2		7.2
83	70	144	66	9		1424	71	140	98	5930	66	2.4	5.6	2.3				7.0		7.0
66	74	186	47	7		1440	67	130	90	5260	79	2.2	4.6	3.6				7.1		7.0
1652	1587	4056	1314	249		33824	1566	3435	2375	123410	1572	700	117.4	80.1				151.4		77.9
72	69	176	57	11		1471	68	149	103	5366	68	3.0	5.1	3.5				6.6		7.1

REMARKS

B

PORT OF OPERATION
A SEWAGE TREATMENT PLANT
IOCHEMICAL TREATMENT

MARCH
MONTH
1964
YEAR

MICHAEL J. KMAK, ASSISTANT SUPERINTENDENT

DIGESTER DATA

LIDS		pH				PERCENT VOLATILE				SUSPENDED SOLIDS P.P.M.				VOLATILE ~~SOLIDS~~ ACIDS			GAS
UDGE		DIGESTER SLUDGE				DIGESTER SLUDGE				SUPERNATANTS				P.P.M.			ANALYSIS
NO. 3	NO. 4	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 2	NO. 3	NO. 4	NO. 1	NO. 3	NO. 4	% CO₂
		6.4				63								1540			
		6.1				67								2680			
		6.4				44				35600				1880			
		6.4				73				30100							
		6.6				50				31580				1630			
		6.8				59				12810				640			
		7.3				57				38200				490			
		7.1				56				20970				380			
		6.8				71								500			
		7.0				76								330			
		7.0				80								420			
		7.1		7.2		76								250	140		
		7.2		7.3		79								170	110		
		7.1		7.0		75								100	230		
		7.2		7.1		92								170	190		
		7.0		7.1		73							18480	160	710		
		6.9		7.1		60							19890	140	560		
		6.9		7.0		91								200	450		
		6.8		6.9				6.2					32730	230	150		
		7.2		7.2		55							16700	100	110		
		7.0		7.0		77					2000			150	70		
		7.1		7.0		61					7880			170	160		
		151.4		77.9		1435				169260	9880		87800	12330	2880		
		6.6		7.1		68				28210	4940		21950	587	262		

A

MONTHLY REPORT OF OP
EAST CHICAGO, INDIANA SEWAGE
GUGGENHEIM BIOCHEMICAL TREATM

CORNEL A. LEAHU SUPERINTENDENT

DATE	DAY OF THE WEEK	WEATHER			GENERAL INFORMATION		GRIT CHAMBER		PRIMARY SETTLING			AERATION					FINAL SETL'G	SLUD		
														AIR USED						
		TEMP. F - MAX.	TEMP. F - MIN.	PRECIPITATION INCHES	RECTANGULAR WEIR M.G.D.	TEMPERATURE OF SEWAGE - F	SCREENINGS RMVD. CU. FT.	GRIT RMVD. CU. FT.	CLEANING MECHANISM HRS.	SLUDGE DRAWN TIMES PER DAY	DETENTION HOURS	RETURN SLUDGE M.G.D.	WASTE SLUDGE M.G.D.	MILLION CUBIC FEET	CU. FT. PER GALLON OF SEWAGE	AERATION PERIOD HRS.	DETENTION HOURS	TO DIGESTERS GAL. X 1000	TO DIGESTERS LBS. VOL. SOLIDS	GAS PRODUCTION
1	SUN				10 295	58			24	6	2.23	4.050	0.586	8.339	0.81	3.41	2.83			
2	MON				10 906	58		36	24	5	1.92	3.869	1.603	7.080	0.65	3.27	2.67	59.6		
3	TUE				10 899	58			24	4	2.09	3.895	1.577	8.143	0.75	3.27	2.67	55.9		
4	WED				13 726	58			24	5	1.66	3.726	1.515	8.138	0.59	2.78	2.12	56.7		
5	THR				11 354	58	12		24	4	2.02	3.923	0.710	8.292	0.73	3.18	2.56			
6	FRI				11 074	58	36	27	24	4	2.07	3.982	0.567	8.786	0.79	3.22	2.61	53.8		
7	SAT				11 091	60			24	5	2.05	3.861	1.583	7.970	0.72	3.23	2.63	53.4		
8	SUN				12 198	58			24	4	1.88	3.922	0.458	8.217	0.67	3.02	2.62	70.0		
9	MON				11 734	56	36	54	24	5	1.94	3.911	1.240	8.301	0.71	3.01	2.49	45.7		
10	TUE				11 642	56			24	4	1.96	4.017	0.627	8.412	0.72	3.11	2.49	56.7		
11	WED				11 750	56			24	5	1.95	4.061	0.720	8.368	0.71	3.09	2.47	39.5		
12	THR				11 711	56			24	4	1.85	3.999	0.762	8.453	0.72	3.11	2.48	43.3		
13	FRI				11 820	56	54	54	24	5	1.95	0.000	0.000	8.313	0.70	3.09	2.45	49.8		
14	SAT				11 452	58			24	4	2.00	4.037	0.340	8.327	0.72	3.15	2.54	28.7		
15	SUN				10 487	58			24	4	1.97	3.913	1.237	8.419	0.80	3.37	2.77	43.5		
16	MON				11 671	58	18	15	24	3	1.96	3.933	0.791	8.307	0.71	3.13	2.49	40.8		
17	TUE				11 481	58			24	3	1.99	3.934	1.133	8.592	0.75	3.15	2.53	25.7		
18	WED				11 103	58			24	4	2.07	4.098	0.000	8.472	0.77	3.22	2.61	39.9		
19	THR				9911	58			24	3	2.31	4.044	0.674	9.239	0.93	3.49	2.73	49.8		
20	FRI				13138	58	24	27	24	4	1.75	4.035	0.659	9.278	0.70	2.84	2.21	56.4		
21	SAT				11485	58			24	3	1.99	3.967	1.150	9.072	0.79	3.13	2.53	52.6		
22	SUN				10595	58			24	5	2.18	4.095	0.000	8.949	0.84	3.33	2.75	46.1		
23	MON				10360	58	12		24	4	2.21	4.074	0.450	9.230	0.89	3.38	2.80	32.1		
24	TUE				11226	58			24	5	2.04	3.861	0.487	9.214	0.82	3.23	2.59	34.0		
25	WED				13499	58	30		24	4	1.70	3.891	0.280	9.200	0.68	2.80	2.15	46.8		
26	THR				10680	56			24	4	2.14	3.899	0.651	9.298	0.87	3.34	2.72	24.4		
27	FRI				10678	56		81	24	6	2.15	4.119	0.169	9.342	0.88	3.30	2.55	32.0		
28	SAT				11 411	56			24	5	2.02	4.114	0.000	9.273	0.81	3.16	2.80	31.8		
29	SUN				10358	56			24	4	2.20	4.029	1.150	9.382	0.91	3.37	2.72	21.3		
30	MON				12 169	54			24	3	1.89	4.052	0.495	9.336	0.76	3.00	2.39	37.6		
31	TUE				12490	56		27	24	4	1.83	3.995	0.797	9.390	0.75	2.95	2.33			
					343756		222	321	744	132	61.97	119.306	22.411	269.132	23.65	48.13	79.48	12139		
					11 089	57	28	40	24	4	2.00	3.977	0.830	8.682	0.76	3.17	2.56	49.5		

GENERAL INFORMATION

AVERAGE B.O.D. - RAW 10.035 LBS. ÷ 0.17 59,029

EQUIVALENT POPULATION

AVERAGE S.S. REMOVED 16,057 LBS. PER DAY

AS UTILIZED DURING MONTH ______ THOUSAND CUBIC FEET

VALUE OF GAS UTILIZED ______

CONNECTED POPULATION 64,800

PAYROLL

ELECTRICITY

OTHER UTILIT

CHEMICALS

OTHER OPER

TOTAL

B

898

PORT OF OPERATION
A SEWAGE TREATMENT PLANT
CHEMICAL TREATMENT

MARCH
MONTH

1964
YEAR

MICHAEL J. KMAK, ASSISTANT SUPERINTENDENT

Aeration Period Hrs.	Final Settling Detention Hours	To Digesters Gal. x 1000	To Digesters Lbs. Vol. Solids	Gas Production Cu. Ft. x 1000	Gas Cu. Ft. per Lb. Vol. Added	To Bed or Filter Gal. x 1000	Incinerator Hours	Bed Sludge or Cake Raw Tons	Chemicals: Sludge Condt. Lime	Chemicals: Sludge Condt. Iron	Chemicals: Sewage Treatment Alum	Chemicals: Sewage Treatment Lime	pH Raw	pH Primary	pH Mixed Liquor	pH Return Sludge	pH Final	5 Day B.O.D. Raw	5 Day B.O.D. Primary	5 Day B.O.D. Final
3.41	2.83										400		8.2	7.9	7.5	7.4	8.0	53	45	6
3.27	2.67	59.6									400		7.3	7.8	7.4	7.2	7.6	116	70	4
3.27	2.67	55.9									400		7.4	7.6	7.2	7.2	7.5	167	100	12
2.78	2.12	56.7									400		7.2	7.4	7.3	7.1	7.4	148	75	8
3.18	2.56										400		7.3	7.6	7.1	6.9	7.4	81	41	2
3.22	2.61	53.8									400									
3.23	2.63	53.4									400									
3.02	2.62	70.0									400		7.3	7.5	7.1	7.0	7.4	107	43	6
3.01	2.49	45.7									400		7.5	7.7	7.3	7.1	7.5	143	33	14
3.11	2.49	56.7									400		7.4	7.5	7.2	7.1	7.5	123	89	16
3.09	2.47	39.5									400		7.1	7.3	7.2	7.0	7.3	202	90	18
3.11	2.48	43.3									400		7.2	7.6	7.0	7.0	7.5	166	45	10
3.09	2.46	49.8									400									
3.15	2.54	28.7									400									
3.37	2.77	43.5									400		7.5	7.6	7.3	7.2	7.5	36	39	8
3.13	2.49	40.8									400		7.3	7.6	7.2	7.1	7.8	131	94	15
3.15	2.53	25.7									400		7.2	7.6	7.3	7.2	7.6	22	47	10
3.22	2.61	39.9									400		7.5	7.6	7.3	7.1	7.5	77	68	15
3.49	2.73	49.8									400		7.5	7.7	7.5	7.2	7.7	39	39	15
2.84	2.21	56.4									400									
3.13	2.53	52.6									400									
3.33	2.75	46.1									400		7.2	7.5	7.5	7.3	7.5	22	27	9
3.38	2.80	32.1									400		7.4	7.5	7.2	6.8	7.3	89	99	15
3.23	2.59	31.0									400		7.2	7.3	7.2	6.9	7.4	91	54	16
2.80	2.15	46.8									400		7.1	7.2	7.0	6.8	7.1	64	64	19
3.34	2.72	24.4									400		7.0	7.3	7.0	6.9	7.3	138	49	18
3.30	2.55	32.0									400									
3.16	2.80	31.8									400									
3.37	2.72	21.3									400		7.4	7.5	7.4	7.1	7.5	211	48	18
3.00	2.39	37.6									400		7.3	7.5	7.4	7.2	7.5	87	75	15
2.95	2.33										400		7.3	7.6	7.3	7.1	7.4	208	95	17
98.13	79.48	1213.9									12400		168.8	173.4	166.9	155.9	172.2	2521	1399	286
3.17	2.56	43.5									400		7.3	7.5	7.3	6.8	7.5	110	61	12

PAYROLL	25,239.57
ELECTRICITY PURCHASED	4,752.74
OTHER UTILITIES	1,418.66
CHEMICALS	
OTHER OPERATING COSTS	13,145.16
TOTAL	44,556.16

% PURIFICATION

TREATMENT	B.O.D.	S.S.
PRIMARY	46	68
SECONDARY	43	26
OVERALL	89	94

A

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK 1	PRECIPITATION—INCHES 2	RAW SEWAGE BY-PASSED—M.G.D. 3	PRIMARY TREAT. ONLY—M.G.D. 4	COMPLETE TREATMENT—M.G.D. 5	STREAM FLOW—M.G.D. 6	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P. 7	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P. 8	GRIT REMOVED FROM GRIT CHAMBER—CU. FT. 9	CHEMICALS USED: ALUM LBS/DAY 10	LBS/DAY 11	LBS/DAY 12	RAW SEWAGE: pH 13	RAW SEWAGE: 5-DAY B.O.D.—P.P.M. 14	RAW SEWAGE: SUSP. SOLIDS—P.P.M. 15	PRIMARY EFFLUENT: pH 16	PRIMARY EFFLUENT: 5-DAY B.O.D.—P.P.M. 17	PRIMARY EFFLUENT: SUSP. SOLIDS—P.P.M. 18	FINAL EFFLUENT: pH 19	FINAL EFFLUENT: 5-DAY B.O.D.—P.P.M. 20	FINAL EFFLUENT: SUSP. SOLIDS—P.P.M. 21	FINAL EFFLUENT: DISSOLVED OXYGEN—P.P.M. 22	RESIDUAL CHLORINE—P.P.M. 23	AERATION MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES 24	AERATION MIXED LIQUOR: SUSP. SOLIDS—P.P.M. 25	AERATION MIXED LIQUOR: SLUDGE INDEX 26	AERATION MIXED LIQUOR: DISSOLVED OXYGEN—P.P.M. 27	AIR USED IN AERATION MILLION CU. FT. 28	RETURN SLUDGE: VOLUME—M.G.D. 29	RETURN SLUDGE: SUSP. SOLIDS—P.P.M. 30
1	W				11.4					400			7.6	75	140	7.7	63	41	7.5	17	5	4.6		130	1464	88	1.2	9.26	4.04	32
2	Th				15.1					400			7.6	217	109	7.7	119	59	7.6	15	6	4.6		120	1316	91	2.0	9.20	4.03	44
3	F				11.7				27	400																		9.44	4.03	
4	S				11.6					400																		9.33	4.06	
5	Su				12.8					400			7.5	114	69	7.6	80	72	7.7	13	9	6.6		140	1864	75	4.0	9.06	4.11	467
6	M				12.9				24	400			7.6	61	208	7.6	41	43	7.5	2	19	5.2		120	1704	70	1.2	8.81	4.14	750
7	T				12.8					400			7.3	30	124	7.4	31	87	7.5	5	15	5.4		120	1732	72	1.8	8.91	4.07	68
8	W				12.6					400			7.5	35	83	7.6	28	33	7.6	11	13	4.4		120	1668	69	1.4	8.83	4.07	83
9	Th				13.3					400			7.6	24	95	7.6	30	45	7.5	7	20	4.6		130	1988	65	1.0	8.79	4.12	85
10	F				13.2				81	400																		9.10	4.08	
11	S				12.7					400																		8.66	4.01	
12	Su				12.7					400																		8.64	3.99	
13	M				12.7				15	400																		8.83	4.03	
14	T				12.7					400																		8.92	4.02	
15	W				11.5					400																		8.95	4.09	
16	Th				12.7					400																		8.18	4.06	
17	F				12.8				27	400																		8.86	4.07	
18	S				11.4					400																		8.92	4.07	
19	Su				10.5					400			7.6	15	124	7.6	7	58	7.5	6	7	7.8		130	1532	85	2.4	8.77	4.11	58
20	M				15.4					400			7.4	44	101	7.5	25	61	7.3	5	18	4.8		125	1528	82	0.8	7.78	4.06	681
21	T				14.7					400			7.4	96	139	7.5	8	50	7.4	4	9	5.2		130	1528	85	0.6	7.61	4.03	86
22	W				13.6					400			7.4	19	230	7.6	16	39	7.6	6	9	4.4		130	1776	73	0.6	7.85	4.09	55
23	Th				13.4					400			7.4	23	122	7.5	22	29	7.5	7	17	5.2		130	1516	86	1.0	7.80	4.05	65
24	F				13.1				54	400																		7.90	4.05	
25	S				11.8					400																		7.43	3.82	
26	Su				11.5					400			7.9	5	108	7.9	9	41	7.6	1	3	4.2		140	1428	98	0.8	7.57	4.04	52
27	M				14.7				27	400			7.2	26	128	7.3	13	41	7.3	10	3	4.8		140	1304	107	1.2	8.35	4.06	625
28	T				14.4					400			7.0	22	236	7.6	11	60	7.5	5	3	4.8		140	1388	101	2.8	8.45	3.97	75
29	W				13.7					400			7.6	28	80	7.7	24	21	7.6	9	3	4.4		150	1516	99	2.6	8.70	4.07	68
30	Th				14.7					400			7.1	50	110	7.5	20	60	7.5	5	4	5.4		150	1432	105	2.6	8.73	4.16	64
31																														
TOTAL					388.1				255	12.0				879	2206		547	840		128	163				26684			258.3	121.6	1091
AVERAGE					12.9				86	400			7.4	52	130	7.6	32	49	7.5	8	10	5.1		130	1570	85	1.6	8.61	4.05	64
TYPE OF SAMPLE ANALYZED*									6				C	C	C	C	C	C	C	C	C	C		C	C		C			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C=COMPOSITE; G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE________. IF BULKING, IN WHA

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN________ QUANTITY OF DRY

WEATHER CONDITIONS________ AVERAGE TEMP. OF

OTHER REMARKS________

B 899

OPERATION
PLANT
PE

REPORT FOR East Chicago (CITY)

FOR MONTH OF April 1964

SIGNED BY Cornel A. Leah

	AERATION						SLUDGE DIGESTION												
	XED LIQUOR			RETURN SLUDGE															
	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.	SUSP. SOLIDS-P.P.M.	WASTE ACT. SLUDGE TO DIGESTER-GAL. X1000	RAW SLUDGE TO DIGESTER-GAL. X1000	TOTAL SOLIDS IN RAW SLUDGE-%	TOTAL VOL. SOLIDS IN RAW SLUDGE-%	TEMPERATURE IN DIGESTER-°F	pH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN-GAL. X 1000	SOLIDS IN SUPERNATANT-%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE-%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE-%	
5	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	
64	88	1.2	9.26	4.04	3240	0.175	36.5	2.9	64	96	7.3			45.0		42.0			
46	91	2.0	9.20	4.03	4410	0.654	42.4	3.8	60	96	7.3			52.0					
			9.44	4.03		0.350	33.9			95				45.0		45.0			
			9.33	4.06		0.416	38.3			95				45.0					
64	75	4.0	9.06	4.11	4670	0.282	47.6	4.9	70	97	7.1			48.0		42.0			
24	70	1.2	8.81	4.14	7500	0.266	42.0	4.1	57	95	7.2			48.0					
32	72	1.8	8.91	4.07	6880	0.407	39.9	3.3	44	98	7.0			45.0		57.0			
68	69	1.4	8.83	4.07	8330		35.7	1.8	78	95	7.2			57.0					
88	65	1.0	8.79	4.12	8520		27.8	1.8	44	98	7.0			48.0		48.0			
			9.10	4.08			25.5			97		14.8		36.0					
			8.66	4.01		0.651	36.6			95		10.9		45.0		48.0			
			8.64	3.99		0.615	39.0			97		12.3		57.0					
			8.83	4.03			39.1			96		14.1		45.0		45.0			
			8.32	4.02		0.518				97		44.0		42.0					
			8.95	4.09		0.178	34.5			95		30.1		36.0		36.0			
			8.18	4.06		0.474	35.3			97		21.4	14.0	45.0					
			8.86	4.07			33.7			98		33.8	24.8	36.0		36.0			
			8.92	4.07		0.363	38.7			98		33.5	40.8	45.0					
32	85	2.4	8.77	4.11	5830			4.5	24	98	7.0	18.7	36.0	39.0		39.0			
28	82	0.8	7.78	4.06	6810		30.1	3.6	71	96	7.0	22.5	34.2	42.0					
28	85	0.6	7.61	4.03	8600		32.7	5.0	60	97	6.9	26.2	41.1	75.0					
76	73	0.6	7.85	4.09	5570		32.5	4.0	64	97	6.9	16.2	46.3	42.0					
46	86	1.0	7.80	4.05	6560	0.117	30.2	2.9	67	94	7.1	34.0	56.1	33.0		33.0			
			7.90	4.05		0.742	28.4			95		19.2	43.3	45.0					
			7.43	3.82			38.1			95		24.5	31.0	30.0		30.0			
28	98	0.8	7.57	4.04	5222	0.480	33.0	2.6	56	95	7.2	18.2	50.7	45.0					
24	107	1.2	8.35	4.06	6250	0.338	35.8	5.3	57	95	6.9	36.7	31.3	39.0		39.0			
88	101	2.8	8.45	3.97	7550	0.538	37.2	4.2	52	95	6.9	26.1	41.1	54.0					
76	99	2.6	8.70	4.07	6830		38.2	2.0	52	97	7.1	43.5	29.5	39.0		39.0			
32	106	2.6	8.73	4.16	6420		32.7	4.3	62	94	7.1	42.4	34.4	54.0					
384			258.3	121.6	109192	7.54	987.4	56.7	980			543.1	556.6	1351.0		579.0			
570	85	1.6	8.61	4.05	6423	0.419	35.3	3.6	58	96	7.1	25.9	37.1	45.0		41.4			
		C			C			6	6		6			6		6			
2		12			12			1	1		1			1		1			

IF BULKING, IN WHAT PERIOD

QUANTITY OF DRY SLUDGE REMOVED

AVERAGE TEMP. OF RAW SEWAGE

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	38	62
SECONDARY TREATMENT	47	30
OVERALL TREATMENT	85	92

DETENTION TIME-HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.20	1.50	1.85
AERATION TANK	3.36	2.51	2.93
FINAL SETTLING TANK	2.77	1.89	2.33

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			855
FINAL SETTLING TANK			547

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			17109
FINAL SETTLING TANK			13694

EQUIV. POP. TREATED = (LBS. B.O.D. RAW SEWAGE ÷ 0.17) 34,107

C. F. AIR/GAL. SEW. TREATED	1.50
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1,560
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	28.7

GARB. TO DIGESTER—% TOT. SOLIDS

GARB. TO DIGESTER—% TOT. VOL. SOL.

LBS. GARB. T.S./DAY TO DIGESTER

LBS. GARB. T.V.S./DAY TO DIGESTER

TOT. LBS. VOL. SOL./DAY TO DIGESTER

C.F. GAS PROD/DAY/LB. V.S. ADDED

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 4,000.00

ELECTRICITY PURCHASED ____ K.W.H. $ 933.26

GAS PURCHASED ____ C.F. $ 47.07

CHEMICALS & SUPPLIES $ 1,869.11

MAINTENANCE $ 19,597.22

OTHER OPERATING COSTS Water $ 144.56

AMORTIZATION COSTS $ ____

PAYMENTS TO DEPRECIATION FUND $ ____

TOTAL $27,161.22

COST/M.G. SEW. TREAT. $ 70.00

COST/CAPITA/MO. $ 0.796

COST/1000 LB. B.O.D. REMOVED $ 185.09

REVENUE RECEIVED $ ____

A

SEND TO BRANCH OFFICE
INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION
SEWAGE TREATMENT PLANT
ACTIVATED SLUDGE TYPE

DAY OF MONTH	DAY OF WEEK	PRECIPITATION–INCHES	RAW SEWAGE BYPASSED–M.G.D.	PRIMARY TREAT. ONLY–M.G.D.	COMPLETE TREATMENT–M.G.D.	STREAM FLOW–M.G.D.	5-DAY B.O.D.–P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.–P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER–CU. FT.	CHEMICALS USED: ALUM LBS/DAY	LBS/DAY	LBS/DAY	RAW SEWAGE: PH	5-DAY B.O.D.–P.P.M.	SUSP. SOLIDS–P.P.M.	PRIMARY EFFLUENT: PH	5-DAY B.O.D.–P.P.M.	SUSP. SOLIDS–P.P.M.	FINAL EFFLUENT: PH	5-DAY B.O.D.–P.P.M.	SUSP. SOLIDS–P.P.M.	DISSOLVED OXYGEN–P.P.M.	RESIDUAL CHLORINE–P.P.M.	AERATION – MIXED LIQUOR: SETTLEABLE SOLIDS % IN 30 MINUTES	SUSP. SOLIDS–P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN–P.P.M.	AIR USED IN AERATION MILLION CU. FT.	RETUR SLUDG: VOLUME–M.G.D.	SUSP. SOLIDS–P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	F	—	—	—	12.0				59	400																		8.54	4.05	
2	S	—	—	—	12.9					400																		9.08	4.19	
3	Su	—	—	—	12.0					400			7.2	42	103	7.6	33	50	7.4	11	3	5.8		150	1508	99	3.6	7.87	4.12	55
4	M	—	—	—	13.7				81	400																		7.86	4.02	
5	T	—	—	—	13.5					400																		7.86	3.97	
6	W	—	—	—	13.6					400			7.3	20	92	7.6	16	41	7.1	4	2	4.4		150	1412	106	0.8	7.84	4.12	598
7	Th	—	—	—	14.7					400																		6.05	4.06	
8	F	—	—	—	13.9					400																		8.05	4.08	
9	S	—	—	—	12.5					400																		8.31	3.87	
10	Su	—	—	—	12.3					400			7.4	36	116	7.4	19	60	7.6	5	6	5.4		150	1589	95	2.6	8.63	4.07	590
11	M	—	—	—	12.9				27	400			7.4	57	67	7.6	18	22	7.6	13	8	4.6		140	1736	105	1.0	8.08	3.99	597
12	T	—	—	—	14.0					400			7.5	43	116	7.7	27	31	7.8	10	11	3.8		150	1400	107	2.6	8.66	4.07	638
13	W	—	—	—	14.3				27	400			7.6	100	196	7.6	36	54	7.3	10	8	3.0		150	1408	107	2.4	8.29	3.91	693
14	Th	—	—	—	13.2					400			7.2	63	95	7.6	27	47	7.5	7	4	3.2		140	1086	85	2.6	8.90	3.99	770
15	F	—	—	—	13.5				27	400																		8.09	4.16	
16	S	—	—	—	13.3					400																		7.77	4.64	
17	Su	—	—	—	11.3					400												5.0		150			2.2	8.08	4.05	
18	M	—	—	—	12.4				27	400			7.9			7.8			7.9			5.0		150			0.8	8.91	4.09	
19	T	—	—	—	12.8					400			7.6			7.7			7.7			4.8		150			0.8	9.03	4.05	
20	W	—	—	—	12.3					400			7.3			7.7			7.6			4.8		140			1.0	9.41	4.05	
21	Th	—	—	—	11.9					400			7.0	56	152	7.8	16	82	7.9	2	3	5.4		150	1728	87	0.6	9.08	4.05	65
22	F	—	—	—	10.9					400																		9.08	4.10	
23	S	—	—	—	11.9					400																		8.98	3.91	
24	Su	—	—	—	12.2					400			7.0	94	80	7.5	44	42	7.5	2	3	5.0		150	1308	83	2.6	8.97	4.07	563
25	M	—	—	—	12.1				81	400			7.6	32	124	7.8	16	66	7.8	2	6	4.4		140	1786	81	1.6	10.01	4.06	808
26	T	—	—	—	12.5					400			7.5	104		7.7	46		7.8	6		4.4		140			0.6	9.29	3.99	
27	W	—	—	—	11.5					400			7.3	31	118	7.6	22	50	7.2	5	7	5.0		140	1652	85	1.2	10.93	4.09	654
28	Th	—	—	—	11.7				14	400			7.5	78	167	7.8	37	64	7.8	6	3	5.2		150	1709	88	0.8	7.93	3.99	6070
29	F	—	—	—	11.3					400																		9.60	4.11	
30	S	—	—	—	10.7					400																		9.48	4.06	
31	Su	—	—	—	9.9					400			7.1	21	107	7.5	18	84	7.6	4	4	4.6		140	1828	77	2.4	9.50	3.98	587
TOTAL					388.2				338					777	1468		375	693		87	70				20760	1205	30.2	266.16	125.36	839
AVERAGE					12.5				42	400			7.4	59	113	7.6	28	53	7.6	6	5	4.9		145	1597	93	1.7	8.59	4.04	646
TYPE OF SAMPLE ANALYZED*													c	c	c	c	c	c	c	c	c	c		c	c		c			c
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C=COMPOSITE; G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE ________ IF BULKING IN WHA

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN ________ QUANTITY OF DRY S

WEATHER CONDITIONS ________ AVERAGE TEMP. OF

OTHER REMARKS ________

P

900

F OPERATION
T PLANT
TYPE

REPORT FOR East Chicago Ind.
FOR MONTH OF May 1954
SIGNED BY

AERATION: MIXED LIQUOR					RETURN SLUDGE	SLUDGE DIGESTION												
SUSP. SOLIDS-P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.	SUSP. SOLIDS-P.P.M.	WASTE ACT. SLUDGE TO DIGESTER GAL X1000	RAW SLUDGE TO DIGESTER-GAL.X1000	TOTAL SOLIDS IN RAW SLUDGE-%	TOTAL VOL. SOLIDS IN RAW SLUDGE-%	TEMPERATURE IN DIGESTER-F.	pH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN-GAL X 1000	SOLIDS IN SUPERNATANT-%	SLUDGE WITHDRAWN GAL X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE-%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE-%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
			8.54	4.05		1.11	36.6			95		39.2	35.9	36.0				
			9.08	4.19			37.0			95		29.5	21.2	52.0				
508	99	3.6	7.87	4.12	5530	0.92	38.0	4.0	65	97	7.0	41.5	45.9	36.0	1.4			
			7.86	4.02			37.9			95		43.6	38.5	60.0				
			7.86	3.97		0.42	36.8			95		53.0	58.0	600				
412	106	0.8	7.84	4.12	5980	0.42	38.3	4.0	68	96	7.0	56.0	35.3	48.0	3.9			
			6.05	4.06		0.62	37.9			96		67.0	64.6	21.0				
			8.08	4.08			39.6			95		58.9	34.7	48.0				
			8.31	3.87		0.77	36.5			95		57.6	46.8	39.0				
589	95	2.6	8.63	4.07	590.0	0.20	41.1	4.9	58	96	7.1	51.7	25.3	51.0	1.9			
336	105	1.0	8.08	3.99	5970	0.49	46.4	3.4	56	96	7.0	42.5	51.9	51.0	0.6			
400	107	2.6	8.66	4.07	6380		34.7	5.2	69	94	7.2	50.4	37.7	51.0	7.7			
408	107	2.4	8.29	3.91	6930	0.72	38.5	8.9	50	96	7.2	58.7	66.1	54.0	2.9			
86	85	2.6	8.90	3.99	7700		34.8	6.8	82	96	7.0	52.8	57.3	450	1.4			
			8.09	4.16		0.03	31.0			96		63.2	64.3	36.0				
			7.77	4.64		0.30	34.0			95		39.4	42.7	54.0				
		2.2	8.08	4.05		0.05	36.9			95	6.9	46.8	59.7	63.0				
		0.8	8.91	4.09			33.8			94	7.1	47.1	41.9	59.0				
		0.8	9.03	4.05			38.5			94	7.1	46.2	58.1	63.0				
		1.0	9.41	4.05		0.04	38.3			95	6.9	41.9	32.4	54.0				
728	87	0.6	9.08	4.05	6500		37.4	4.1	52	96	7.2	47.6	56.9	60.0	1.8			
			9.08	4.10		0.61	49.1			96		42.9	42.2	54.0				
			8.99	3.91		0.49	34.6			95		37.2	25.4	54.0				
308	83	2.6	8.97	4.07	5630		47.4	1.9	45	97	7.1	39.5	41.2	45.0	0.8			
786	81	1.6	10.01	4.06	8080	0.31	38.9	4.7	59	96	7.3	39.5	50.0	48.0	1.0			
		0.6	9.39	3.99		0.26	35.4	4.9	56	97	7.2	44.8	37.5	48.0				
52	85	1.2	10.43	4.09	6540	0.69	35.1	4.9	65	97	7.1	49.5	59.1	69.0	1.1			
704	88	0.8	7.43	3.99	6070	0.39	46.9	2.9	20	97	7.2	37.4	48.5	51.0	5.5			
			9.60	4.11		0.30	35.4			98		30.8	43.2	72.0				
			9.48	4.06		0.34	38.0			99		37.5	20.6	60.0				
828	77	2.4	9.50	3.98	5870	1.15	33.1	4.9	48	96	7.0	36.7	55.1	59.0	2.7			
760	1205	30.2	266.16	125.36	83980	10.95	1168.5	65.3	743			1415.4	1386.0	1816.0	32.7			
597	93	1.7	8.59	4.04	6460	0.48	37.7	4.7	53	97	7.1	45.7	44.7	58.0	2.6			
C	C				C			G	G		G			G	G			
12	12				12													

IF BULKING IN WHAT PERIOD

QUANTITY OF DRY SLUDGE REMOVED

AVERAGE TEMP. OF RAW SEWAGE

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	SS
PRIMARY TREATMENT	53	53
SECONDARY TREATMENT	37	43
OVERALL TREATMENT	90	96

DETENTION TIME-HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.14	1.57	1.85
AERATION TANK	3.52	2.60	3.06
FINAL SETTLING TANK	2.93	1.97	2.45

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			829
FINAL SETTLING TANK			531

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			16,578
FINAL SETTLING TANK			13,270

EQUIV. POP. TREATED = (LBS. B.O.D. RAW SEWAGE ÷ 0.17) 38,841

C. F. AIR/GAL. SEW. TREATED	1.46
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	2944
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	29.4

GARB. TO DIGESTER-% TOT. SOLIDS	
GARB. TO DIGESTER-% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD./DAY LB. V.S. ADDED	

MAN DAYS AT PLANT — PAYROLL/MO.	$4,000.00
ELECTRICITY PURCHASED — K.W.H	$1,477.76
GAS PURCHASED C.F.	$ 116.80
CHEMICALS & SUPPLIES	$ 579.25
MAINTENANCE	$15,771.29
OTHER OPERATING COSTS Water	$ 156.45
AMORTIZATION COSTS	$
PAYMENTS TO DEPRECIATION FUND	$
TOTAL	$22,100.55

COST/M.G. SEW. TREAT. $ 56.93
COST/CAPITA/MO. $ 0.569
COST/1000 LBS BOD REMOVED $ 152.03
REVENUE RECEIVED $

A

SEND TO BRANCH OFFICE
INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION
SEWAGE TREATMENT PLANT
GUGGENHEIM BIOCHEMICAL TREATMENT

									CHEMICALS USED			RAW SEWAGE			PRIMARY EFFLUENT			FINAL EFFLUENT					AERATION MIXED LIQUOR					
DAY OF MONTH	DAY OF WEEK	PRECIPITATION-INCHES	RAW SEWAGE BY-PASSED-M.G.D.	PRIMARY TREAT. ONLY-M.G.D.	COMPLETE TREATMENT-M.G.D.	STREAM FLOW-M.G.D.	5-DAY B.O.D.-P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.-P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER-CU. FT.	Alum LBS/DAY	LBS/DAY	LBS/DAY	pH	5-DAY B.O.D.-P.P.M.	SUSP. SOLIDS-P.P.M.	pH	5-DAY B.O.D.-P.P.M.	SUSP. SOLIDS-P.P.M.	pH	5-DAY B.O.D.-P.P.M.	SUSP. SOLIDS-P.P.M.	DISSOLVED OXYGEN-P.P.M.	RESIDUAL CHLORINE-P.P.M.	SETTLEABLE SOLIDS % IN 30 MINUTES	SUSP. SOLIDS-P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	M				11.5				27	400			7.1	133	149	7.5	26	60	7.5	6	4	4.6		130	1624	80	0.8	9.65	4.04
2	T				10.6					400			7.2	79	131	7.2	33	69	7.6	12	4	7.0		140	1684	83	0.2	9.54	3.89
3	W				10.7					400			7.2	30	106	7.6	19	62	7.6	1	9	5.8		150	1888	79	1.0	9.51	4.06
4	Th				10.5					400			7.0	41	94	7.2	21	90	7.4	4	3	5.4		150	1736	86	0.6	9.49	3.99
5	F				10.4				14	400																		8.54	3.98
6	S				9.9					400																		9.36	4.01
7	Su				8.4					400			7.0	31	140	7.5	17	53	7.6	1	8	7.4		150	1292	116	1.4	9.08	4.00
8	M				10.9				54	400			7.2	60	145	7.6	20	53	7.8	3	4	6.2		140	1580	90	0.8	9.16	4.05
9	T				11.4					400			7.0	38	164	7.4	19	74	7.5	3	3	7.6		140	1544	91	1.2	9.26	4.11
10	W				9.7					400			7.1	33	100	7.5	17	60	7.6	3	3	7.8		150	1572	95	1.8	8.26	3.90
11	Th				10.1					400			7.0	66	140	7.3	13	104	7.5	2	3	8.0		150	1560	96	1.2	9.12	4.02
12	F				11.1				54	400																		8.93	4.06
13	S				9.8					400																		8.72	4.07
14	Su				9.6					400			7.1	34	82	7.5	17	34	7.5	8	7	7.6		140	1420	99	1.6	8.18	4.09
15	M				10.7				27	400			7.1	64	119	7.4	67	79	7.4	6	4	7.8		150	1732	87	1.0	9.04	4.06
16	T				9.2					400			7.1	118	126	7.5	21	49	7.5	8	7	8.0		150	1844	81	0.8	9.06	4.05
17	W				8.3					400			7.2	263	180	7.5	45	78	7.5	15	10	6.8		160	1856	86	0.8	9.02	4.07
18	Th				9.6					400			7.0	211	198	7.2	27	66	7.4	12	6	6.2		150	1824	92	1.6	8.51	4.00
19	F				12.7					400																		8.41	4.02
20	S				11.6					400																		8.50	395
21	Su				11.2					400			7.0	91	131	7.3	23	37	7.3	12	6	7.6		150	1228	122	4.0	8.12	4.08
22	M				12.1				54	400			6.8	42	79	7.2	26	38	7.3	7	7	8.2		130	1112	117	1.6	8.36	4.04
23	T				12.4					400			7.2	35	79	7.6	27	52	7.6	11	3	6.8		130	1568	83	1.2	8.48	4.05
24	W				11.8				54	400			7.1	52	87	7.6	25	59	7.5	9	2	5.2		130	1544	84	1.0	8.45	4.02
25	Th				11.6					400			7.0	72	82	7.4	39	56	7.5	9	3	7.2	0.4	130	1592	82	1.0	8.51	398
26	F				11.6				12	400													0.3					8.60	4.08
27	S				10.3					400													0.4					8.50	3.53
28	Su				9.4					400			7.2	59	103	7.5	26	28	7.5	10	7	4.6	0.3	130	1260	103	1.0	8.50	4.06
29	M				9.6				14	400			7.0	129	122	7.3	33	46	7.3	8	1	5.6	0.3	120	1256	86	0.8	8.54	398
30	T				8.8					400			7.0	98	104	7.3	61	77	7.3	10	2	6.4	0.4	140	1564	90	1.4	8.47	399
31																													
TOTAL					315.5				310					1779	2661		612	1318		159	116			3110	34260		274	26527	120.0
AVERAGE					10.5				34	400			7.1	81	121	7.4	28	60	7.5	7	5	5.5		140	1557	92	1.2	8.84	4.01
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C		C	C		C		
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12		

*C=COMPOSITE; G-GRAB.

APPEARANCE OF ACTIVATED SLUDGE Good

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None

WEATHER CONDITIONS 2.61" Rainfall Aver 3.60

OTHER REMARKS We had a rain and wind Storm from June 19

IF BULKING, IN WHA

QUANTITY OF DRY

AVERAGE TEMP. OF

L

901

OF OPERATION
ENT PLANT
GAL TREATMENT

REPORT FOR EAST CHICAGO, INDIANA (CITY)

FOR MONTH OF JUNE 1964

SIGNED BY Lionel A. Deakin

AERATION					RETURN SLUDGE		SLUDGE DIGESTION												
MIXED LIQUOR																			
IN 30 MINUTES	SUSP. SOLIDS-P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.	SUSP. SOLIDS-P.P.M.	WASTE ACT SLUDGE TO DIGESTER-GAL. X1000	RAW SLUDGE TO DIGESTER-GAL X1000	TOTAL SOLIDS IN RAW SLUDGE-%	TOTAL VOL. SOLIDS IN RAW SLUDGE-%	TEMPERATURE IN DIGESTER-°F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN-GAL. X 1000	SOLIDS IN SUPERNATANT-%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE-%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE-%
24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
130	1624	80	0.8	9.65	4.04	6270	0.5	33.9	4.1	55	97	7.0	35.6	39.0	57.0	4.2			
140	1684	83	0.2	9.54	3.89	6610	0.5	31.9	5.9	60	98	7.1	39.5	51.2	42.0	5.1			
150	1888	79	1.0	9.51	4.06	5850	0.0	37.1	4.9	50	97	7.0	38.2	19.4	60.0	3.1			
150	1736	86	0.6	9.49	3.99	6540	0.7		5.8	48	98	7.0	36.0	36.7	60.0	2.6			
				8.54	3.98		0.9	32.5			96		39.1	40.1	57.0				
				9.36	4.01		0.0	28.7			98		41.9	42.4	57.0				
150	1292	116	1.4	9.08	4.00	5550	0.0	21.0	5.8	54	98	7.3	42.4	42.3	51.0	2.1			
140	1580	90	0.8	9.16	4.05	6550	0.0	54.0	2.8	57	98	7.3	41.4	39.6	36.0	2.5			
140	1544	91	1.2	9.25	4.11	5670	0.0	44.0	4.7	61	98	7.1	44.4	38.3	36.0	1.4			
150	1572	95	1.8	8.26	3.90	5230	0.0	42.0	4.2	48	98	7.2	52.6	28.2	42.0	0.7			
150	1560	96	1.2	9.12	4.02	5240	0.0	51.0	4.3	48	97	7.2	47.5	32.1	33.0				
				8.93	4.06		0.0	48.6			95		47.1	50.0	48.0				
				8.72	4.07		0.0	51.0			96		43.9	45.9	36.0				
140	1420	99	1.6	8.18	4.09	5300	0.0	51.0	3.1	63	97	7.3	29.8	33.6	36.0	2.5			
150	1732	87	1.0	9.04	4.06	5990	0.0	54.0	4.1	47	98	7.0	41.0	34.0	57.0	6.4			
150	1844	81	0.8	9.06	4.05	6120	0.0	51.0	4.2	43	98	7.0	34.5	38.0	57.0	4.8			
160	1856	86	0.8	9.02	4.07	7880	0.0	36.0	4.5	52	95	7.0	17.3	15.7	36.0	3.8			
150	1824	92	1.6	8.51	4.00	7150	0.6	45.0	3.7	56	94	6.9	19.7	29.8	36.0	3.9			
				8.41	4.02		0.2	51.0			85		18.5	9.3	24.0				
				8.50	3.95		0.4	42.0			88		9.6	22.3	63.0				
150	1228	122	4.0	8.42	4.08	7830	0.0	36.0	4.0	40	90	6.9	18.1	26.3	30.0	2.4			
130	1112	117	1.6	8.36	4.04	6850	0.0	42.0	4.6	45	94	6.9	18.6	11.0	90.0	3.7			
130	1568	83	1.2	8.48	4.05	6035	0.2	51.0	5.6	48	94	7.1	22.2	11.9	42.0	2.4			
130	1544	84	1.0	8.45	4.02	6980	0.2	51.0	4.3	60	94	7.1	24.7	26.8	84.0	6.8			
130	1592	82	1.0	8.51	3.98	6450	0.7	45.0	3.9	61	94	7.1	25.8	24.2	51.0	3.6			
				8.60	4.08		0.3	43.0			94		27.5	27.8					
				8.50	3.53		0.5	51.0			94		30.6	30.4	48.0				
130	1260	103	1.0	8.50	4.06	6020	0.0	42.0	2.8	71	93	7.0	31.9	10.4	90.0	5.7			
120	1256	96	0.8	8.54	3.98	5690	0.5	36.0	2.4	42	91	7.0	29.4	41.6	45.0	2.1			
140	1564	90	1.4	8.47	3.99	6260	0.1	36.0	3.7	72	90	7.0	28.1	32.0		1.6			
3110	34260		27.4	265.07	120.0	138260		123.9	98.4	1181			966.8	930.0	1398.0				
140	1557	92	1.2	8.84	4.01	6285	0.6	42.7	4.5	54	95	7.1	32.2	31.0	49.9	3.4			
C	C		C			C			6	6		6			6	6			
12	12		12			17			12	12		1			1	1			

IF BULKING, IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AVERAGE TEMP. OF RAW SEWAGE 95° Air Temp. Max 83.5 Min 64.5

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	65	50
SECONDARY TREATMENT	26	46
OVERALL TREATMENT	91	96

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.76	1.78	2.27
AERATION TANK	3.95	2.92	3.44
FINAL SETTLING TANK	3.29	2.29	2.79

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			696
FINAL SETTLING TANK			446

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			13,8[illegible]
FINAL SETTLING TANK			11,146

EQUIV. POP. TREATED= 41,725
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	1.19
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	2751
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	36.4

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 4,589.68

ELECTRICITY PURCHASED ____ K.W.H. $ 1,571.98

GAS PURCHASED ____ C.F. $ 109.02

CHEMICALS & SUPPLIES $ ____

MAINTENANCE $ 17,401.36

OTHER OPERATING COSTS WATER $ 466.21

AMORTIZATION COSTS $ ____

PAYMENTS TO DEPRECIATION FUND $ ____

TOTAL $ 24,138.25

COST/M.G. SEW. TREAT. $ 76.51

COST/CAPITA/MO. $ 0.423

COST/1000 LB. B.O.D. REMOVED $ 238.06

REVENUE RECEIVED $ ____

A

SEND TO BRANCH OFFICE
INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION
SEWAGE TREATMENT PLANT
GUGGENHEIM BIOCHEMICAL TREATMENT

										CHEMICALS USED			RAW SEWAGE			PRIMARY EFFLUENT			FINAL EFFLUENT					AERATION MIXED LIQUOR					RETURN SLUDGE	
DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	ALUM LBS/DAY	CHLORINE LBS/DAY	LBS/DAY	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	DISSOLVED OXYGEN—P.P.M.	RESIDUAL CHLORINE—P.P.M.	SETTLEABLE SOLIDS % IN 30 MINUTES	SUSP. SOLIDS—P.P.M.	SLUDGE INDEX	[illegible] NITROGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	W	—	—	—	9.1				14	400	120		7.0	109	86	7.4	37	49	7.3	12	9	6.6	0.5	140	1996	70	0.6	8.73	3.98	659
2	Th	—	—	—	11.7					400	120		7.0	100	122	7.3	42	63	7.2	7	5	6.8	0.5	150	1956	77	1.2	8.76	4.05	692
3	F	—	—	—	10.3					400	120																	8.50	3.88	
4	S	—	—	—	9.8					400	120																	8.70	4.17	
5	Su	—	—	—	7.9					400	120		7.0	59	72	7.6	43	44	7.5	6	1	6.4	0.3	140	1660	84	1.0	8.90	3.96	732
6	M	—	—	—	10.8				12	400	120		7.0	101	126	7.0	66	77	7.2	9	2	7.3	0.3	140	1440	97	6.0	8.75	4.07	456
7	T	—	—	—	13.2					400	120		7.0	86	144	7.2	23	36	7.3	9	5	5.2	0.3	130	1612	117	1.4	9.32	3.98	476
8	W	—	—	—	10.2				27	400	120		7.0	85	104	7.2	11	37	7.3	11	4	5.2	0.3	120	1380	87	0.4	8.72	4.00	613
9	Th	—	—	—	9.8					400	120		7.0	71	68	7.2	15	52	7.3	7	10	5.2	0.3	120	1376	87	1.6	8.50	4.00	572
10	F	—	—	—	10.1				8	400	120																	9.30	4.01	
11	S	—	—	—	10.1					400	120																	9.50	4.02	
12	Su	—	—	—	7.3					400	120		7.0	48	66	7.4	46	35	7.4	19	5	7.4	0.5	150	1580	95	1.2	9.00	3.97	786
13	M	—	—	—	10.5				27	400	120		7.0	196	263	7.4	56	44	7.5	13	5	7.0	0.5	140	1432	98	1.2	8.50	4.06	9600
14	T	—	—	—	10.9					400	120		7.0	29	75	7.3	25	37	7.4	13	4	7.8	0.4	150	1480	101	1.2	8.70	3.99	647
15	W	—	—	—	10.5					400	120		6.8	205	141	7.3	28	74	7.4	13	1	7.8	0.4	140	1432	98	1.4	8.50	3.81	1116
16	Th	—	—	—	9.3					400	120		7.0	39	100	7.3	41	54	7.4	16	1	7.4	0.5	150	1664	90	1.2	8.90	3.96	374
17	F	—	—	—	8.8				27	400	120		6.5	128	103	7.1	82	41	7.8	7	7	7.2	0.5	150	1808	83	1.6	9.90	3.92	503
18	S	—	—	—	9.4					400	120																	8.50	4.06	
19	Su	—	—	—	9.8					400	120		7.0	38	65	7.7	28	33	7.8	5	3	8.0	0.5	150	2060	73	4.6	8.50	3.97	5690
20	M	—	—	—	11.0				54	400	120		7.2	228	143	7.1	51	43	7.2	16	4	7.2	0.2	140	1236	113	4.6	9.00	3.98	4390
21	T	—	—	—	12.0					400	120		7.2	30	61	7.1	23	29	7.3	9	7	5.2	0.5	130	1532	85	5.2	9.50	4.01	602
22	W	—	—	—	11.5				54	400	120		7.0	87	91	7.7	25	33	7.7	4	10	5.8	0.5	150	1496	100	1.0	8.50	4.01	666
23	Th	—	—	—	11.0					400	120		7.1	78	63	7.6	67	35	7.8	11	10	7.6	0.5	140	1688	83	1.6	9.00	3.98	3800
24	F	—	—	—	12.5					400	120																	8.50	3.92	
25	S	—	—	—	12.0					400	120																	8.50	4.03	
26	Su	—	—	—	12.5					400	120		7.1	185	75	7.5	102	56	7.7	15	10	7.2	0.5	130	1696	77	1.2	8.50	4.08	549
27	M	—	—	—	12.5				54	400	120		7.3	61	112	7.7	41	49	7.8	9	6	8.0	0.5	140	1452	96	1.0	8.50	4.03	581
28	T	—	—	—	11.0					400	120		7.2	101	103	7.5	33	40	7.7	10	8	7.4	0.5	140	1448	97	2.2	8.50	3.98	587
29	W	—	—	—	10.5				81	400	120		7.2	46	108	7.6	32	82	7.7	11	7	7.2	0.5	140	1636	86	1.2	8.50	4.02	452
30	Th	—	—	—	10.0					400	120		7.3	143	131	7.6	32	72	7.9	9	1	7.8	0.5	130	2200	59	1.0	8.50	4.06	9100
31	F	—	—	—	10.5					400	120																	8.50	3.97	
TOTAL					326.4				358		3720			2249	2318		942	1115		228	125			3210	36760	2653		2702	12392	1432
AVERAGE					10.5				36	400	120		7.1	98	101	7.4	41	48	7.5	10	5	6.9	0.4	140	1598	90	1.9	8.78	4.00	622
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C	G	C	C		C			0
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C-COMPOSITE; G-GRAB

APPEARANCE OF ACTIVATED SLUDGE Good

IS WORKING IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None

QUANTITY OF DRY S

WEATHER CONDITIONS Aver. 75.7° Hi. 94° Low 54°

AVERAGE TEMP. OF

OTHER REMARKS None

B

902

OPERATION
T PLANT
AL TREATMENT

REPORT FOR EAST CHICAGO (CITY)

FOR MONTH OF JULY 1961

SIGNED BY

AERATION IXED LIQUOR				RETURN SLUDGE		SLUDGE DIGESTION												
SUSP. SOLIDS-P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.	SUSP. SOLIDS-P.P.M.	WASTE ACT. SLUDGE TO DIGESTER-GAL. X1000	RAW SLUDGE TO DIGESTER-GAL. X1000	TOTAL SOLIDS IN RAW SLUDGE-%	TOTAL VOL. SOLIDS IN RAW SLUDGE-%	TEMPERATURE IN DIGESTER-°F.	pH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN-GAL. X 1000	SOLIDS IN SUPERNATANT-%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE-%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE-%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
96	70	0.6	8.73	3.98	6590	0.3	18.0	3.5	63	92	7.0	18.5	20.1	36.0	3.9			
56	77	1.2	8.70	4.05	6920	0.5	51.0	4.4	67	92	7.0	24.5	43.6	0.0				
			8.60	3.88		0.3	51.0			93		41.6	20.5	51.0				
			8.70	4.17		0.5	48.0			94		34.2	47.9	63.0				
60	84	1.0	8.90	3.96	7320	0.6	45.0	3.2	50	95	7.1	34.1	31.1	48.0	3.0			
40	97	6.0	8.75	4.07	4560	0.6	54.0	3.5	65	95	7.0	37.4	39.4	45.0	1.2			
12	117	1.4	9.32	3.98	4760	0.6	48.0	6.0	60	96	7.0	39.7	38.5	54.0	1.4			
80	87	0.4	8.72	4.00	6130	0.9	45.0	6.0	50	96	7.0	66.6	69.5	48.0	3.2			
76	87	1.6	8.50	4.00	5720	0.1	45.0	3.5	59	95	7.1	53.2	47.7	45.0	3.2			
			9.20	4.01		0.6	33.0			96		44.7	47.8	45.0				
			9.50	4.02		0.0	48.0			97		38.6	32.1	33.0				
80	95	1.2	9.00	3.97	7860	0.5	39.0	3.1	56	97	7.3	41.0	50.4	48.0	2.2			
32	98	1.2	8.50	4.06	9600	0.5	45.0	3.3	71	96	7.2	25.6	22.7	39.0	2.4			
80	101	1.2	8.70	3.99	6470	0.6	51.0	4.1	52	98	7.1	51.6	50.2	60.0	2.3			
32	98	1.4	8.50	3.81	11160	1.6	51.0	2.8	57	98	7.0	34.7	28.2	51.0	4.1			
44	90	1.2	8.90	3.96	3740	0.6	48.0	2.0	60	97		63.0	44.6	39.0	4.7			
08	83	1.6	9.90	3.92	5030	0.4	54.0	3.3	41	98		26.1	18.8	48.0	1.8			
			8.50	4.06		0.3	48.0			98		38.3	27.8	54.0				
60	73	4.6	8.50	3.97	5690	0.6	51.0	3.9	50	99		36.0	0.5	45.0	5.3			
36	113	4.6	9.00	3.98	4390	0.9	48.0	3.6	56	99		24.6	18.8	27.0				
32	85	5.2	9.50	4.01	6020	0.6	51.0	3.7	44	99	7.0	22.7	21.4	45.0				
96	100	1.0	8.50	4.01	6650	0.0	45.0	4.3	48	98	7.4	23.2	14.7	48.0	2.6			
88	83	1.6	9.00	3.98	3800	0.1	42.0	4.3	57	97	7.5	20.8	4.8	45.0	8.1			
			8.50	3.92		0.4	51.0			98		23.6	0.3	0.0				
			8.50	4.03		0.3	48.0			96		29.6	10.8	51.0				
96	77	1.2	8.50	4.08	5490	0.0	45.0	3.1	53	97	7.4	26.4	33.9	48.0	2.0			
52	96	1.0	8.50	4.03	5810	0.4	39.0	4.3	57	96	7.5	23.9	22.8	45.0	1.3			
48	97	2.2	8.50	3.98	5870	0.2	51.0	4.0	61	98	7.6	32.8	50.4	39.0				
36	86	1.2	8.50	4.03	4520	0.4	42.0	4.6	62	95	7.4	22.1	17.3	51.0	1.7			
200	59	1.0	8.50	4.06	9100	0.2	45.0	4.7	50	97	7.5	42.5	40.9	42.0	2.6			
			8.50	3.97		0.6	45.0			98		35.4	24.1	45.0				
5760	2053		2702	12392	143200		1425.0	89.2	1281			1088.0	941.6	1338.0	57.0			
598	90	1.9	8.78	4.00	6226	1.9	45.1	3.9	56	96	7.2	35.0	30.4	46.1	3.0			
2		C			0			G	G		G			G	G			
2		12			12													

IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 71°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	58	52
SECONDARY TREATMENT	32	43
OVERALL TREATMENT	90	95

DETENTION TIME-HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.61	1.74	2.21
AERATION TANK	3.73	2.96	3.39
FINAL SETTLING TANK	3.67	2.20	2.87

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			696
FINAL SETTLING TANK			446

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			13,926
FINAL SETTLING TANK			11,146

EQUIV. POP. TREATED = 54,089
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	1.21
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	42.80
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	31.2

GARB. TO DIGESTER-% TOT. SOLIDS	
GARB. TO DIGESTER-% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ___ PAYROLL/:10.	$ 4502.32
ELECTRICITY PURCHASED ___ K.W.H.	$ 949.54
GAS PURCHASED ___ C.F.	$ 196.05
CHEMICALS & SUPPLIES	$ 1920.00
MAINTENANCE	$ 778.88
OTHER OPERATING COSTS WATER	$ 283.90
AMORTIZATION COSTS	$
PAYMENTS TO DEPRECIATION FUND	$
TOTAL	$ 8580.69

COST/M.G. SEW. TREAT. $ 26.29

COST/CAPITA/MO. $ 0.151

COST/1000 LB. B.O.D. REMOVED $ 0.073

REVENUE RECEIVED $

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

GUGGENHEIM BIOCHEMICAL TREATMEN

ACTIVATED SLUDGE TYPE

										CHEMICALS USED			RAW SEWAGE			PRIMARY EFFLUENT			FINAL EFFLUENT					AERATION MIXED LIQUOR					
DAY OF MONTH	DAY OF WEEK	PRECIPITATION-INCHES	RAW SEWAGE BY-PASSED-M.G.D.	PRIMARY TREAT. ONLY-M.G.D.	COMPLETE TREATMENT-M.G.D.	STREAM FLOW-M.G.D.	5-DAY B.O.D.-P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.-P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER-CU. FT.	ALUM LBS/DAY	CHLORINE LBS/DAY	LBS/DAY	PH	5-DAY B.O.D.-P.P.M.	SUSP. SOLIDS-P.P.M.	PH	5-DAY B.O.D.-P.P.M.	SUSP. SOLIDS-P.P.M.	PH	5-DAY B.O.D.-P.P.M.	SUSP. SOLIDS-P.P.M.	DISSOLVED OXYGEN-P.P.M.	RESIDUAL CHLORINE-P.P.M.	SETTLEABLE SOLIDS % IN 30 MINUTES	SUSP. SOLIDS-P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	S				10.0					400	120												0.4					8.50	3.97
2	Su				10.5					400	120		7.0	27	73	7.4	18	28	7.6	4	9	7.8	0.4	130	1784	73	5.8	8.50	4.08
3	M				10.0					400	120		7.2	48	99	7.5	33	75	7.6	11	9	4.4	0.4	140	1772	79	1.4	8.50	3.94
4	T				10.5					400	120		7.2	30	84	7.4	34	[illegible]	7.6	10	9	6.0	0.4	140	1441	97	1.4	8.50	4.02
5	W				11.0					400	120		7.2	28	82	7.6	19	57	7.8	11	9	6.6	0.4	140	1240	113	1.2	8.50	4.02
6	Th				10.5					400	120		7.1															8.50	3.99
7	F				11.0					400	120																	8.50	3.99
8	S				10.5					400	120												0.4					8.50	4.01
9	Su				10.0					400	120		7.1	00	60	7.6	00	60	7.7	2	8	8.2	0.4	140	1756	80	2.0	8.56	4.05
10	M				10.5					400	120		7.5	87	90	7.6	68	60	7.8	14	6	5.8	0.6	130	1660	78	1.8	8.60	3.97
11	T				10.0					400	120		7.1	48	100	7.4	33	17	7.9	9	9	7.8	0.6	150	1992	75	1.6	8.60	4.07
12	W				10.0					400	120		7.3	79	82	7.4	51	52	7.8	8	4	7.2	0.4	140	1594	91	1.6	8.60	4.04
13	Th				9.5					400	120		7.3	146	162	7.7	57	52	7.9	14	9	7.2	0.4	140	1548	90	1.2	8.60	4.13
14	F				9.0					400	120												0.3					8.50	4.06
15	S				9.0					400	120												0.4					8.60	4.09
16	Su				8.5					400	120		7.3	45	114	7.5	59	40	7.8	5	9	5.6	0.3	140	1408	99	1.4	8.60	4.04
17	M				11.5					400	120		7.7	224	193	7.7	122	62	7.8	9	4	6.0	0.3	130	1724	75	3.2	8.50	3.97
18	T				11.0					400	120		7.2	106	120	7.6	67	57	8.0	12	13	5.0	0.3	140	1544	91	1.8	8.50	3.99
19	W				9.5					400	120		7.0	197	134	7.2	92	57	7.4	11	2	4.2	0.3	140	1572	89	4.0	8.97	4.06
20	Th				12.0					400	120		6.9	167	82	7.1	78	55	7.8	18	7	1.0	0.3	140	1652	85	2.2	9.14	4.03
21	F				9.5					400	120												0.3					9.15	4.03
22	S				9.0					400	120																	9.40	4.01
23	Su				11.0					400	120		6.8	118	98	7.1	28	41	7.2	10	2	4.2		130	1840	71	1.0	9.51	4.08
24	M				10.0					400	120		7.0	65	82	7.2	62	45	7.3	9	6	4.0	0.4	130	2184	60	5.2	8.18	4.03
25	T				10.0					400	120		7.0	140	90	7.2	63	95	7.2	16	11	4.2	0.3	130	1880	69	1.0	9.05	4.05
26	W				7.1					400	120		7.4	167	98	7.2	54	44	7.1	8	12	4.2	0.3	140	2044	68	2.0	9.16	4.01
27	Th				7.9					400	120		7.0	100	81	7.2	51	58	7.6	8	9	8.6	0.4	130	2216	59	0.8	9.80	3.99
28	F				7.2				14	400	120												0.3					9.04	3.98
29	S				7.6					400	120																	10.01	4.06
30	Su				7.3					400	120		7.0	100	90	7.3	66	66	7.4	8	7	6.2		150	1888	79	1.6	9.04	3.95
31	M				7.0					400	120		7.1	83	109	7.5	46	51	7.5	10	7	5.8	0.4	140	1944	78	1.0	9.12	4.00
TOTAL					298.1				14					2005	2123		1101	1098		207	161			2890	36633	1693		274.59	124.69
AVERAGE					9.7					400	120		7.1	95	101	7.4	52	52	7.6	10	8	5.7	0.4	138	1744	81	2.1	8.86	4.02
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C	G	C	C		C		
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	12	12	12		12		

*C=COMPOSITE; G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE Good

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None

WEATHER CONDITIONS Aver. 71.7° Hi. 98° Low 48°

OTHER REMARKS None

IF BULKING IN WHA

QUANTITY OF DRY

AVERAGE TEMP. OF

OPERATION
MICAL TREATMENT
YPE

REPORT FOR East Chicago, Ind. (CITY)

FOR MONTH OF August 1964

SIGNED BY Conrad A. [illegible]

AERATION MIXED LIQUOR				RETURN SLUDGE		SLUDGE DIGESTION												
SUSP. SOLIDS-P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.	SUSP. SOLIDS-P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X1000	RAW SLUDGE TO DIGESTER- GAL. X1000	TOTAL SOLIDS IN RAW SLUDGE-%	TOTAL VOL. SOLIDS IN RAW SLUDGE-%	TEMPERATURE IN DIGESTER-°F	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN- GAL. X 1000	SOLIDS IN SUPERNATANT-%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE-%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE-%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
			8.50	3.97		0.5	45.0			98		29.5	13.9	45.0				
1284	73	5.8	8.50	4.08	5400	0.2	48.0	3.8	58	97	7.7	16.4	17.4	45.0	1.7			
1772	79	1.4	8.50	3.94	4820	0.9	48.0	4.6	68	98	7.7	29.6	18.0	36.0	6.3			
1441	97	1.4	8.50	4.02	5780	0.2	45.0	4.4	62	98	7.4	27.7	29.1	48.0	3.5			
24	113	1.2	8.50	4.02	5930	0.4	45.0	3.9	60	98	7.5	34.2	24.0	42.0	5.2			
			8.50	3.99		0.5	45.0			98		18.8	5.8	45.0				
			8.50	3.99		0.6	45.0			97		35.3	19.4	48.0				
			8.50	4.01		0.2	46.0			97		41.1	49.1	45.0				
1756	80	2.0	8.50	4.05	6010	0.1	45.0	4.4	58	98	7.6	41.0	22.8	51.0	5.8			
1660	78	1.8	8.60	3.97	5200	1.0	57.0	3.8	47	97	7.6	20.8	17.1	45.0	2.0			
1992	75	1.6	8.60	4.07	8770	0.3	51.0	2.4	58	97	7.3	36.5	23.9	57.0	4.0			
1544	91	1.6	8.60	4.04	3210	0.4	51.0	5.4	48	97	7.3	25.0	14.0	51.0	3.4			
1548	90	1.2	8.60	4.13	6420	0.4	39.0	4.6	61	98	7.8	3.6	3.0	15.0	1.6			
			8.50	4.06		0.4	42.0			96		21.2	20.5	39.0				
			8.60	4.09		0.3	48.0			97		27.0	26.0	48.0				
1408	99	1.4	8.60	4.04	3370	0.3	45.0	1.8	56	98	7.6	14.7	9.4	48.0	3.1			
1724	75	3.2	8.50	3.97	5300	0.3	45.0	4.0	50	97	7.3	16.6	22.3	45.0				
1544	91	1.8	8.50	3.99	8210	0.3	45.0	6.3	48	97	7.2	13.2	10.3	36.0	4.8			
1572	89	4.0	8.97	4.06	3370	0.2	00.0	4.2	58	97	6.9	18.0	15.0	45.0	5.4			
1652	85	2.2	9.14	4.03	8777	0.0	22.5	4.4	45	98	6.9	13.7	14.4	27.0	2.4			
			9.15	4.03		0.0	21.0			97		21.5	26.6	0.0				
			9.40	4.01		0.4	22.3			98		11.6	4.4	27.0				
1840	71	1.0	9.51	4.08	4410	0.0	22.3	3.9	55	98	6.9	13.8	3.4	45.0	3.0			
2184	60	5.2	9.18	4.03	13570	0.3	22.3	3.7	56	98	6.9	15.1	26.8	24.0	1.9			
1880	69	1.0	9.05	4.05	11310	0.1	22.3	3.8	56	98	7.0	17.7	7.5	36.0	4.3			
2044	68	2.0	9.16	4.01	9010	0.6	19.9	4.0	47	98	7.1	15.0	20.2	24.0	3.1			
2216	59	0.8	9.80	3.99	8780	1.2	22.4	3.4	52	95	7.1	20.0	12.6	36.0	4.2			
			9.04	3.98		0.8	19.8			82		15.0	12.1	00.0				
			10.01	4.05		0.4	21.0			98		24.0	37.1	30.0				
1898	79	1.6	9.04	3.95	9190	0.0	22.3	2.6	69	93	7.1	16.4	1.5	45.0	1.6			
1944	78	1.0	9.12	4.00	8190	0.3	23.4	4.5	65	97	7.2	23.4	7.7	21.0	0.6			
36633	1693		274.59	124.69	145027	11.6	1685.6		1167			677.3	535.3	1149.0				
1744	81	2.1	8.86	4.02	6906	0.4	36.5	4.0	56	97	7.2	21.9	17.3	39.6	3.4			
C		C			C			G	G		G			G	G			
12		12			12													

IF BULKING IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AVERAGE TEMP. OF RAW SEWAGE 72°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	45	49
SECONDARY TREATMENT	44	43
OVERALL TREATMENT	89	92

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	3.29	1.92	2.6
AERATION TANK	4.43	2.47	3.45
FINAL SETTLING TANK	4.16	2.42	3.29

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			643
FINAL SETTLING TANK			412

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE
PRIMARY SETTLING TANK			12,814
FINAL SETTLING TANK			10,297

EQUIV. POP. TREATED= (LBS. B.O.D. RAW SEWAGE ÷ 0.17) 45,209

C. F. AIR/GAL. SEW. TREATED	0.92
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1874
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	34.9

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ___ PAYROLL/MO. $4525.20

ELECTRICITY PURCHASED ___ K.W.H. $1,147.68

GAS PURCHASED ___ C.F. $ 181.55

CHEMICALS & SUPPLIES $ 274.80

MAINTENANCE Water $ 277.85

OTHER OPERATING COSTS $ 861.47

AMORTIZATION COSTS $ ___

PAYMENTS TO DEPRECIATION FUND $ ___

TOTAL $7268.63

COST/M.G. SEW. TREAT. $ 24.39

COST/CAPITA/MO. $ 0.112

COST/1000 LB. B.O.D. REMOVED $ 32.00

REVENUE RECEIVED $ ___

A

SENT TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION

SEWAGE TREATMENT PLANT

GUGGENHEIM BIOCHEMICAL TREATMENT

Day of Month	Day of Week	Precipitation—Inches	Raw Sewage By-Passed—M.G.D.	Primary Treat. Only—M.G.D.	Complete Treatment—M.G.D.	Stream Flow—M.G.D.	5-Day B.O.D.—P.P.M. Upstream of S.T.P.	5-Day B.O.D.—P.P.M. Downstream of S.T.P.	Grit Removed from Grit Chamber—Cu. Ft.	Chemicals Used: Alum Lbs/Day	Chemicals Used: Chlorine Lbs/Day	Chemicals Used: Lbs/Day	Raw Sewage: pH	Raw Sewage: 5-Day B.O.D.—P.P.M.	Raw Sewage: Susp. Solids—P.P.M.	Primary Effluent: pH	Primary Effluent: 5-Day B.O.D.—P.P.M.	Primary Effluent: Susp. Solids—P.P.M.	Final Effluent: pH	Final Effluent: 5-Day B.O.D.—P.P.M.	Final Effluent: Susp. Solids—P.P.M.	Final Effluent: Dissolved Oxygen—P.P.M.	Final Effluent: Residual Chlorine—P.P.M.	Aeration Mixed Liquor: Settleable Solids % in 30 Minutes	Aeration Mixed Liquor: Susp. Solids—P.P.M.	Aeration Mixed Liquor: Sludge Index	Aeration Mixed Liquor: Dissolved Oxygen—P.P.M.	Air Used in Aeration Million Cu. Ft.	Volume—M.G.D.
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	T				6.7					400	120		7.0	188	103	7.2	125	59	7.3	20	6	9.6	0.3	150	2248	61	1.8		
2	W				7.2					400	120		6.9	117	99	7.2	123	56	7.3	15	8	7.8	0.3	130	1924	68	1.0	9.08	3.99
3	Th				7.6					400	120		6.9	93	83	7.4	44	40	7.4	19	17	7.8	0.3	150	2012	72	1.6	9.02	3.93
4	F				7.7					400	120																	8.84	4.04
5	S				6.7					400	120																	8.56	4.03
6	Su				5.4					400	120																	8.67	4.13
7	M				6.1					400	120		7.0	111	128	7.4	40	86	7.7	14	11	5.4	0.3	140	2096	67	0.0	8.44	4.09
8	T				7.3					400	120		7.0	166	277	7.2	29	86	7.8	17	3	5.4	0.3	130	1824	71	0.0	8.65	4.04
9	W				7.1					400	120		6.9	99	146	7.4	108	60	7.5	10	8	7.8	0.3	140	2116	66	1.0	8.58	3.90
10	Th				8.1					400	120		7.0	21	197	7.3	27	59	7.3	11	10	7.8	0.3	140	1764	78	2.0	8.51	3.87
11	F				7.2				27	400	120																	8.51	3.90
12	S				5.2					400	120																	8.53	3.84
13	Su				7.5					400	120																	8.65	3.86
14	M				8.6					400	120		7.0	125	125	7.4	42	58	7.4	3	3	9.1	0.3	150	1620	93	3.2	8.64	4.02
15	T				8.3					400	120		7.0	77	88	7.4	64	90	7.4	4	6	10.8	0.3	150	1744	86	0.4	8.48	4.05
16	W				7.7					400	120		7.0	34	134	7.2	80	63	7.3	3	3	9.6	0.3	150	1880	80	1.4	8.64	3.87
17	Th				8.8					400	120		7.1	72	164	7.4	52	61	7.5	22	7	10.8	0.3	150	1976	76	1.8	8.64	3.90
18	F				7.9				27	400	120		6.6	99	223	7.0	64	88	7.1	18	10	9.4	0.3	150	1956	77	1.4	8.64	3.87
19	S				7.5					400	120																	8.77	3.90
20	Su				11.7					400	120																	8.67	3.88
21	M				11.3				81	400	120		6.9	37	105	7.2	11	18	7.1	28	10	7.4	0.3	130	2088	62	2.6	8.50	4.06
22	T				11.6				27	400	120		6.9	73	149	7.2	30	66	7.2	24	8	10.2	0.3	130	1972	66	1.0	8.49	3.95
23	W				10.8					400	120		6.9	38	159	7.2	00	49	7.2	24	8	9.0	0.3	150	1852	81	1.6	8.51	3.95
24	Th				9.7					400	120		7.2	191	260	7.6	55	44	7.6	26	7	14.0	0.3	150	2160	69	2.0	8.54	3.85
25	F				10.3					400	120		6.9	112	139	7.0	68	63	7.0	29	8	9.6	0.3	150	2312	65	2.0	8.62	4.00
26	S				13.1					400																		8.47	3.84
27	Su				9.7					400																		8.66	4.03
28	M				12.5					400			7.3	69	89	7.6	27	37	8.0	7	4	12.6		150	1996	75	5.4	8.70	3.71
29	T				9.6				27	400			7.0	82	92	7.3	17	43	7.3	8	8	10.8		140	1704	84	2.0	8.65	3.95
30	W				10.0					400			6.9	133	97	7.4	24	81	7.3	24	8	9.2		140	2020	69	2.2	8.61	3.92
31	Th									400			7.0	198	109	7.2	35	45	7.2	24	6	10.8		150	1956	77	1.8	8.70	4.00
TOTAL					258.5				189					2349	2966		1065	1252		350	159				41300	1548		259.40	118.34
AVERAGE					8.6				38	400	120		7.0	112	141	7.3	53	60	7.0	17	8	9.1	0.3	144	1967	74	1.9	8.65	3.95
TYPE OF SAMPLE ANALYZED*													C	C	C	C	G	C	C	C	C	C	G	C	C		C		
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12		

*C=COMPOSITE; G=GRAB.

APPEARANCE OF ACTIVATED SLUDGE Good

IF BULKING, IN WH

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None

QUANTITY OF DRY

WEATHER CONDITIONS Aver. 65.9 Hi. 94° Low 40°

AVERAGE TEMP. OF

OTHER REMARKS None

F OPERATION
NT PLANT
CAL TREATMENT

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF SEPTEMBER 1964

SIGNED BY

AERATION: MIXED LIQUOR: SUSP. SOLIDS—P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	RETURN SLUDGE: VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	SLUDGE DIGESTION: WASTE ACT. SLUDGE TO DIGESTER—GAL. X1000	RAW SLUDGE TO DIGESTER—GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER—°F	pH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
2248	61	.8	9.08	3.99	7360	0.6	19.9	4.9	58	98	7.0	4.3	2.4	24.0	2.5			
1924	68	1.0	9.02	3.93	5820	0.7	22.8	4.6	68	98	7.0	2.1	1.5	21.0	2.3			
2092	72	1.6	8.84	4.04	24090	0.6	18.6	3.9	61	97	6.9	1.6	1.3	54.0				
			8.56	4.03		0.8	20.0			98		18.3	0.2	3.0				
			8.67	4.13		—	15.2			98		16.2	1.4	0.0				
			8.44	4.09		—	16.1			97		20.4	6.2	18.0				
2096	67	0.0	8.65	4.04	7940	—	18.8	4.0	71	97		15.2	2.1	0.0	1.4			
1824	71	0.0	8.58	3.90	8640	0.7	19.8	2.4	67	98	7.1	16.5	13.4	15.0	2.0			
2116	66	1.0	8.51	3.87	20590	1.6	13.5	4.1	59	97	7.0	14.0	6.3	9.0	2.2			
1764	72	2.0	8.51	3.90	11960	1.3	16.2	3.4	56	97	7.0	19.3	5.6	16.0	4.8			
			8.53	3.84		1.1	20.8			96		18.6	0.0	36.0				
			8.65	3.86		1.3	15.0			97		16.2	3.0	18.0				
1620	93	3.2	8.64	4.02	13300	0.1	17.7	3.2	22	95	7.0	17.7	9.7	24.0	1.7			
1744	86	0.4	8.48	4.05	13180	0.4	18.6	3.3	75	97	7.0	19.6	17.1	21.0	3.3			
1880	80	1.4	8.64	3.87	4640	1.1	21.0	3.5	54	97	7.0	24.4	20.6	15.0	1.9			
1976	76	1.8	8.64	3.90	6530	1.0	239	3.9	67	97	7.1	24.6	21.8	21.0	1.9			
1956	77	1.4	8.61	3.87	5890	2.3	19.5	4.1	65	97	7.0	23.9	0.1	24.0	1.8			
			8.77	3.90		0.9	19.5			97		25.7	23.2	24.0				
			8.67	3.88		1.1	20.6			98		32.1	24.9	33.0				
2088	62	2.6	8.50	4.06	6420	0.6	14.5	3.5	65	98	7.0	20.7	0.0	21.0	0.4			
1972	66	1.0	8.49	3.95	10910	1.0	16.6	4.9	64	98	6.9	15.7	0.6	24.0	1.9			
1852	81	1.6	8.51	3.95	9060	1.2	19.0	5.0	52	97	6.9	26.6	21.1	21.0	2.7			
2160	69	2.0	8.54	3.85	16010	1.5	19.7	4.8	50	98	7.0	28.3	23.5	21.0	2.5			
2312	65	2.0	8.62	4.00	6300	0.9	16.3	3.3	75	98	6.9	26.2	30.9	24.0	3.0			
			8.47	3.84		1.4	21.1			98		25.4	21.2	21.0				
			8.66	4.03		0.5	16.6			98		17.9	0.0	21.0				
1896	75	5.4	8.70	3.71	7740	2.1	17.5	4.1	57	97	7.1	15.7	21.1	27.0	1.9			
1704	82	2.0	8.65	3.95	5000	—	21.2	3.9	61	98	7.0	19.1	3.9	24.0	3.1			
2020	69	2.2	8.61	3.92	17490	0.9	15.4	3.8	58	97	0	14.2	3.7	63.0	2.9			
1956	77	1.6	8.70	4.00	6590	0.6	17.7	4.4	50	97	7.0	15.5	17.7	18.0	1.6			
41300	1548		259.40	118.34	214360	26.3	511.5	83.0	1250			567.0	365	680	45.3			
1967	74	1.9	8.65	3.95	10280	1.2	17.1	3.9	59	97	7.0	18.6	11.3	22.7	2.2			
C		C			C			G	G		G			G	G			
12		12			12													

IF BULKING, IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AVERAGE TEMP. OF RAW SEWAGE 71°

B

SUMMARY DATA 904

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	53	57
SECONDARY TREATMENT	32	37
OVERALL TREATMENT	85	94

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	4.32	1.75	2.79
AERATION TANK	5.84	2.85	4.00
FINAL SETTLING TANK	5.60	2.21	3.61

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			571
FINAL SETTLING TANK			367

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			11429
FINAL SETTLING TANK			9149

EQUIV. POP. TREATED— 47,251
(LBS. B.O.D. RAW SEWAGE ÷0.17)

C. F. AIR/GAL. SEW. TREATED	1.00
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1832
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	33.3

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ___ PAYROLL/MO. $4,557.44
ELECTRICITY PURCHASED ___ K.W.H. $ 876.64
GAS PURCHASED ___ C.F. $ 184.95
~~CHEMICALS PURCHASED~~ Fuel Oil $ 400.00
~~MAINTENANCE~~ Water $ 299.60
OTHER OPERATING COSTS $ 555.58
AMORTIZATION COSTS $ ——
PAYMENTS TO DEPRECIATION FUND $ ——
TOTAL $6874.21
COST/M.G. SEW. TREAT. $ 26.54
COST/CAPITA/MO $ 0.121
COST/1000 LB. B.O.D. REMOVED $ 34.03
REVENUE RECEIVED $

A

SEND TO BRANCH OFFICE

INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION
SEWAGE TREATMENT PLANT
GUGGENHEIM BIOCHEMICAL TREATMENT

										CHEMICALS USED			RAW SEWAGE			PRIMARY EFFLUENT			FINAL EFFLUENT					AERATION MIXED LIQUOR						RETURN SLUDGE
DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	LBS/DAY ALUM	LBS/DAY CHLORINE	LBS/DAY	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS.—P.P.M.	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	DISSOLVED OXYGEN—P.P.M.	RESIDUAL CHLORINE—P.P.M.	SETTLEABLE SOLIDS % IN 30 MINUTES	SUSP. SOLIDS—P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Th				10.5					400	120		6.8	70	103	7.0	45	43	7.1	25	5	11.2	0.3	140	2076	67	2.2	8.64	3.95	19
2	F				7.8				27	400	120																	8.67	3.88	
3	S				6.6					400	120																	8.10	3.98	
4	Su				5.9					400	120		6.9	84	148	7.1	63	47	7.2	17	4	10.8	0.3	150	1344	81	1.6	8.49	3.98	55
5	M				9.5					400	120		7.1	180	148	7.3	62	58	7.3	29	10	10.4	0.3	150	1740	86	1.6	8.74	3.94	16
6	T				9.4					400	120		7.0	196	156	7.2	28	50	7.3	25	3	12.0	0.3	140	1764	82	2.6	8.95	3.88	69
7	W				9.4					400	120		6.9	122	86	7.2	64	51	7.3	28	9	11.4	0.3	150	1564	96	2.0	8.75	4.00	18
8	Th				9.2					400	120		6.9	164	206	7.0	79	47	7.1	28	9	11.2	0.3	150	1512	106	2.2	8.46	4.01	14
9	F				9.9				14	400	120																	8.35	3.84	
10	S				9.1					400	120																	8.25	3.79	
11	Su				9.8					400	120		7.0	80	75	7.2	83	55	7.1	1	1	12.2	0.3	150	1372	118	1.8	8.75	3.67	26
12	M				9.5					400	120		6.9	156	131	7.1	99	63	7.2	28	9	10.8	0.3	150	1536	98	1.4	8.06	4.06	50
13	T				9.1					400	120		7.1	251	312	7.3	98	54	7.4	29	9	8.8	0.3	140	1512	93	1.2	8.90	3.71	50
14	W				10.6				27	400	120		7.2	78	175	7.6	62	58	7.6	24	1	10.0	0.3	140	1656	85	1.4	9.53	4.00	87
15	Th				10.9					400	120		7.2	103	110	7.7	6	50	7.7	4	6	11.0	0.3	140	1380	101	1.6	9.59	397	61
16	F				10.8				27	400	120																	9.60	3.97	
17	S				10.8					400	120																	9.67	3.95	
18	Su				9.6					400	120		7.6	122	127	7.7	39	38	7.8	20	3	10.6	0.5	150	1888	79	1.8	8.33	4.00	15
19	M				9.4				27	400	120		7.0	187	364	7.2	83	65	7.7	22	2	10.6	0.3	150	1692	84	1.8	[illegible]	3.65	45
20	T				10.1					400	120		7.1	186	326	7.0	66	59	7.2	19	6	7.0	0.3	160	1348	119	1.4	8.66	3.93	53
21	W				9.1					400	120		6.9	169	162	7.2	60	61	7.3	2	1	6.4	0.3	160	1420	115	1.6	9.01	3.38	60
22	Th				10.6					400	120		6.8	143	407	7.1	68	62	7.2	17	7	6.4	0.3	140	1268	110	1.0	9.62	3.95	99
23	F				10.7					400	120																	9.15	3.98	
24	S				9.7					400	120																	8.95	4.02	
25	Su				8.5					400	120		6.8	85	65	7.3	32	59	7.2	6	2	6.4	0.3	140	1652	85	1.2	8.53	3.89	41
26	M				8.1				14	400	120		6.8	156	331	7.2	37	81		16	3	6.2	0.3	160	1748	90	[illegible]	[illegible]	3.97	68
27	T				10.0					400	120		6.9	200	236	7.2	52	53	7.2	18	1	6.0	0.3	150	1504	100	1.0	8.95	3.93	57
28	W				10.7					400	120		7.0	123	133	7.4	95	74	7.4	18	5	6.4	0.3	150	1572	95	1.0	8.78	3.93	[illegible]
29	Th				10.0					400	120		6.9	213	364	7.0	55	78	7.1	18	9	6.0	0.3	160	9082	18	1.2	[illegible]	3.87	32
30	F				9.8					400	120																	8.73	3.89	
31	S				9.8					400	120																	[illegible]	3.93	
TOTAL					293.8				136					2996	4165		1276	1200		396	105				40890			[illegible]	[illegible]	201
AVERAGE					9.5				23	400	120		7.0	143	198	7.2	61	57	7.3	19	5	9.1	0.3	149	1947	91	1.6	8.74	3.92	95
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C	G	C	C		C			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12		12		12	12		12			12

*C—COMPOSITE: G—GRAB

APPEARANCE OF ACTIVATED SLUDGE Good

IF BULKING, IN WH

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None

QUANTITY OF DRY

WEATHER CONDITIONS Aver. 51.1° Hi 81° Low 27°

AVERAGE TEMP. OF

OTHER REMARKS No. I Pri. Down Oct. 26 & 27th for new chain and scrapers [illegible] Service Oct.

OPERATION
T PLANT
L TREATMENT

REPORT FOR East Chicago Ind. (CITY)

FOR MONTH OF October 1964

SIGNED BY

AERATION						SLUDGE DIGESTION												
MIXED LIQUOR				RETURN SLUDGE														
SUSP SOLIDS P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN-P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME-M.G.D.	SUSP SOLIDS-P.P.M.	WASTE ACT. SLUDGE TO DIGESTER-GAL. X 1000	RAW SLUDGE TO DIGESTER GAL. X 1000	TOTAL SOLIDS IN RAW SLUDGE-%	TOTAL VOL. SOLIDS IN RAW SLUDGE-%	TEMPERATURE IN DIGESTER-°F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN-GAL. X 1000	SOLIDS IN SUPERNATANT-%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE-%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE-%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
276	67	2.2	8.64	3.95	19390	0.8	9.2	3.9	55	97	6.9	15.2	11.0	21.0	2.7			
			8.67	3.88		1.4	16.0			95		18.1	9.9	15.0				
			8.10	3.98		0.3	7.5			96		23.7	7.8	21.0				
244	81	1.6	8.69	3.98	5540	1.2	10.9	3.4	65	94	7.0	25.5	25.3	30.0				
40	86	1.6	8.74	3.94	16730	0.5	30.4	4.1	50	94	7.1	25.7	23.1	33.0	2.9			
64	82	2.6	8.95	3.88	6910	1.2	14.1	4.5	64	94	7.1	16.1	7.4	33.0	2.5			
24	96	2.0	8.75	4.00	18030	0.4	17.9	4.3	62	94	7.1	18.9	14.5	0.0				
112	106	2.2	8.86	4.01	14310	0.4	19.7	4.6	55	95	7.1	20.5	22.3	21.0	4.1			
			8.35	3.84		1.3	0.0			95		23.8	25.1	0.0				
			8.25	3.79		1.8	26.0			95		25.9	28.3	24.0				
272	118	1.8	8.75	3.67	2650	0.4	33.0	5.4	61	95	6.9	38.5	31.8	27.0	1.6			
36	98	1.4	8.66	4.06	5020	0.3	24.0	3.9	66	95	7.0	25.0	26.3	36.0	3.5			
12	93	1.2	8.90	3.71	5070	1.9	11.9	4.9	58	95	7.1	25.3	21.8	30.0	0.8			
56	85	1.6	9.53	4.00	8720	0.7	23.1	3.4	65	94	7.2	29.1	31.5	21.0	2.8			
80	101	1.6	9.59	3.97	6100	0.5	23.4	3.5	54	95	7.4	31.3	31.8	24.0	1.9			
			9.60	3.97		0.5	24.1			95		30.5	26.9	24.0				
			9.67	3.95		1.2	23.6			95		28.8	19.3	30.0				
88	79	1.8	8.53	4.00	15030	0.5	24.5	2.7	62	96	7.8	30.8	28.1	30.0				
92	84	1.8	[illegible]	3.65	4590	3.0	27.1	3.6	72	95	7.4	35.6	17.6	27.0	2.0			
18	119	1.4	[illegible]	3.93	5350	1.4	22.2	3.3	53	97	7.1	27.4	28.6	27.0	2.1			
20	115	1.6	9.01	3.38	6060	1.3	24.8	4.4	65	96	6.9	29.3	15.9	24.0	0.8			
68	110	1.0	[illegible]	3.95	9960	1.0	17.3	4.5	52	95	6.9	25.3	35.6	18.0	2.3			
			9.15	[illegible]		1.4	27.7			92		35.1	33.2	18.0				
			8.75	4.02		1.6	15.9			91		43.1	43.3	27.0				
52	85	1.2	8.73	3.89	4170	1.1	18.0	3.7	76	94	7.0	41.9	44.6	24.0	1.7			
68	90	[illegible]	[illegible]	3.97	6890	0.5	23.7	4.5	69	96	7.9	40.8	26.8	24.0	2.0			
64	100	1.0	8.95	3.93	5280	0.5	16.0	2.6	75	97	7.0	32.2	26.5	0.0				
72	95	1.0	8.78	3.93	1740	0.1	21.1	3.0	71	97	7.1	34.0	24.4	21.0	2.2			
82	18	1.2	[illegible]	3.87	32640	0.7	19.1	3.6	65	97	6.9	24.9	18.4	24.0	1.2			
			8.73	3.89		0.9	21.0			97		22.8	21.1	23.0				
			[illegible]	3.93		1.1	21.6			98		29.2	26.6	21.0				
890			[illegible]	[illegible]	201580	29.9	613.8					884.3	760.8	728.0				
947	91	1.6	8.74	3.72	9599	1.0	20.5	3.9	63	95	7.1	28.5	24.5	26.0	2.2			
		c			c			G	G		G			G	G			
12		12			12													

IF BULKING, IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AVERAGE TEMP. OF RAW SEWAGE 66°.

Service Oct. 28th

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	57	71
SECONDARY TREATMENT	30	26
OVERALL TREATMENT	87	97

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	3.82	2.10	2.96
AERATION TANK	4.94	3.28	4.11
FINAL SETTLING TANK	4.41	2.65	3.53

SURFACE FLOW RATE GAL. SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			630
FINAL SETTLING TANK			403

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			12599
FINAL SETTLING TANK			10085

EQUIV. POP. TREATED= 66,646
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.924
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	865
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	23.7

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ___ PAYROLL/MO.	$ 3,931.80
ELECTRICITY PURCHASED, ___ K.W.H.	$ 1,248.91
GAS PURCHASED ___ C.F.	$ 183.25
CHEMICALS & SUPPLIES	$ 406.30
~~MAINTENANCE~~ Fuel Oil	$ 700.00
~~OTHER OPERATING COSTS~~ Water	$ 279.80
~~AMORTIZATION COSTS~~ Oper. Costs	$ 200.99
PAYMENTS TO DEPRECIATION FUND	$
TOTAL	$ 6,951.05
COST/M.G. SEW. TREAT. $	23.70
COST/CAPITA/MO. $	0.107
COST/1000 LB. B.O.D. REMOVED $	22.20
REVENUE RECEIVED $	

A

SEND TO BRANCH OFFICE
INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION
SEWAGE TREATMENT PLANT
GUGGENHEIM BIOCHEMICAL TREATMENT

DAY OF MONTH	DAY OF WEEK 1	PRECIPITATION—INCHES 2	RAW SEWAGE BY-PASSED—M.G.D. 3	PRIMARY TREAT. ONLY—M.G.D. 4	COMPLETE TREATMENT—M.G.D. 5	STREAM FLOW—M.G.D. 6	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P. 7	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P. 8	GRIT REMOVED FROM GRIT CHAMBER—CU. FT. 9	CHEMICALS USED LBS/DAY ALUM 10	CHEMICALS USED LBS/DAY 11	CHEMICALS USED LBS/DAY 12	RAW SEWAGE pH 13	RAW SEWAGE 5-DAY B.O.D.—P.P.M. 14	RAW SEWAGE SUSP. SOLIDS—P.P.M. 15	PRIMARY EFFLUENT pH 16	PRIMARY EFFLUENT 5-DAY B.O.D.—P.P.M. 17	PRIMARY EFFLUENT SUSP. SOLIDS—P.P.M. 18	FINAL EFFLUENT pH 19	FINAL EFFLUENT 5-DAY B.O.D.—P.P.M. 20	FINAL EFFLUENT SUSP. SOLIDS—P.P.M. 21	FINAL EFFLUENT DISSOLVED OXYGEN—P.P.M. 22	FINAL EFFLUENT RESIDUAL CHLORINE—P.P.M. 23	AERATION MIXED LIQUOR SETTLEABLE SOLIDS % IN 30 MINUTES 24	AERATION MIXED LIQUOR SUSP. SOLIDS—P.P.M. 25	AERATION MIXED LIQUOR SLUDGE INDEX 26	AERATION MIXED LIQUOR DISSOLVED OXYGEN—P.P.M. 27	AERATION AIR USED IN AERATION MILLION CU. FT. 28	RETURN SLUDGE VOLUME—M.G.D. 29	RETURN SLUDGE SUSP. SOLIDS—P.P.M. 30
1	Su				9.1					400			7.1	62	77	7.2	47	50	7.3	19	4	6.2		150	1468	102	2.4	8.63	4.00	40
2	M				10.9					400																		8.72	3.99	
3	T				9.2					400																		8.50	3.86	
4	W				9.2				27	400			7.1	109	137	7.3	46	59	7.3	17	9	5.8		150	1596	94	0.8	8.81	3.83	495
5	Th				9.4					400			7.0	175	202	7.2	64	86	7.3	17	1	6.0		170	1752	97	1.6	8.74	3.97	552
6	F				9.2					400																		8.77	4.17	
7	S				8.4					400																		8.65	4.32	
8	Su				7.9					400			7.1	68	103	7.2	87	76	7.3	8	5	6.0		160	1588	101	1.4	8.70	4.43	457
9	M				8.9				14	400			6.9	112	298	7.0	80	120	7.1	14	14	6.0		160	1524	105	1.0	8.62	4.31	828
10	T				8.7					400			6.9	90	125	7.0	69	86	7.1	18	8	6.0		180	1368	132	0.8	8.59	4.25	644
11	W				9.2				15	400			6.9	171	281	7.1	61	54	7.2	16	1	5.8		170	1372	124	1.0	8.70	4.23	553
12	Th				9.1					400			6.8	176	404	6.8	28	111	7.0	16	9	5.8		170	1312	130	0.8	8.67	4.20	525
13	F				9.0					400																		8.94	4.24	
14	S				9.4					400																		8.86	4.27	
15	Su				10.2					400			7.2	176	136	7.2	28	293	7.1	16	6	6.0		190	1436	132	2.0	8.64	4.32	621
16	M				10.1				54	400			6.9	60	119	7.3	63	35	7.3	12	1	4.8		160	1724	93	1.2	8.82	4.26	775
17	T				10.0					400			7.0	114	163	7.3	35	89	7.4	11	6	5.8		160	1824	88	1.0	8.75	4.31	793
18	W				10.0					400			7.0	78	92	7.2	77	49	7.3	28	1	5.8		170	1576	108	1.0	8.87	4.23	132
19	Th				10.4					400			7.0	77	95	7.1	56	66	7.2	18	14	5.6		170	1768	96	1.6	8.79	4.22	649
20	F				10.1					400																		8.86	4.20	
21	S				9.5					400																		9.01	4.19	
22	Su				8.5					400			7.4	84	132	7.3	66	79	7.3	14	5	5.4		150	1644	91	1.4	8.93	4.25	763
23	M				8.7				18	400			7.3	127	133	7.1	80	46	7.0	15	9	5.2		160	1684	95	1.0	8.88	4.29	721
24	T				9.1					400			7.2	69	91	7.1	58	53	7.3	14	3	4.0		160	1612	99	0.8	8.83	4.30	457
25	W				9.0				14	400																		8.63	4.27	
26	Th				7.8					400			6.9	89	137	7.1	56	66	7.3	13	3	4.6		150	1332	113	1.6	8.62	4.35	574
27	F				13.8				14	400																		8.72	4.24	
28	S				9.2					400																		8.81	4.24	
29	Su				9.5					400			7.3	114	216	7.2	52	50	7.2	18	12	6.2		150	1580	95	2.2	8.97	4.32	437
30	M				10.0				27	400			7.0	72	171	7.1	43	43	7.3	14	16	5.4		160	1636	98	2.7	8.95	4.20	513
31																														
TOTAL					284.5				183					2023	3112		1094	1511		300	127							262.24	126.30	
AVERAGE					9.5				23	400			7.0	106	164	7.1	58	80	7.2	16	7	5.6		163	1568	103	1.4	8.76	4.21	636
TYPE OF SAMPLE ANALYZED*													C	C	C	C	C	C	C	C	C	C		C	C		C			C
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12		12	12		12			12

*C-COMPOSITE; G-GRAB.

.PPEARANCE OF ACTIVATED SLUDGE Good IF BULKING IN WHAT

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN None QUANTITY OF DRY S

WEATHER CONDITIONS Aver. 43.7° Hi 75° Low 7 AGE TEMP. OF R

OTHER REMARKS . Not Chlorinating Because of Ruptured Line Due To Freezing

B

906

OF OPERATION
NT PLANT
ICAL TREATMENT

REPORT FOR East Chicago Ind. (CITY)

FOR MONTH OF November 1964

SIGNED BY

AERATION MIXED LIQUOR SUSP. SOLIDS—P.P.M. 25	SLUDGE INDEX 26	DISSOLVED OXYGEN P.P.M. 27	AIR USED IN AERATION MILLION CU. FT. 28	RETURN SLUDGE VOLUME—M.G.D. 29	RETURN SLUDGE SUSP. SOLIDS—P.P.M. 30	SLUDGE DIGESTION WASTE ACT. SLUDGE TO DIGESTER - GAL. X1000 31	RAW SLUDGE TO DIGESTER - GAL X1000 32	TOTAL SOLIDS IN RAW SLUDGE—% 33	TOTAL VOL. SOLIDS IN RAW SLUDGE—% 34	TEMPERATURE IN DIGESTER—°F. 35	PH IN DIGESTER 36	GAS PRODUCTION CU. FT. X 1000 37	GAS USED CU. FT. X 1000 38	SUPERNATANT WITHDRAWN—GAL. X 1000 39	SOLIDS IN SUPERNATANT—% 40	SLUDGE WITHDRAWN GAL. X 1000 41	TOTAL SOLIDS IN DIGESTED SLUDGE—% 42	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—% 43
1468	102	2.4	8.63	4040	4040	0.35	19.8	3.9	39	97	7.1	28.1	27.8	21.0	0.6			
			8.72	3.99		0.12	29.4			98		30.5	33.3	21.0				
			8.50	3.86		1.11	30.2			97		38.9	34.1	30.0				
1596	94	0.8	8.81	3.83	4950	0.28	27.6	5.8	74	97	7.1	42.9	32.1		1.0			
1752	97	1.6	8.74	3.97	5520	0.73	24.3	3.5	76	97	7.2	38.5	17.7	27.0	1.0			
			8.77	4.17		0.89	21.0			97		36.1	18.8	48.0				
			8.65	4.92		0.88	18.0			98		36.1	21.2	30.0				
1588	101	1.4	8.70	4.43	4570	0.70	30.0	3.7	69	98	7.1	43.0	43.0	36.0	3.3			
1524	105	1.0	8.62	4.31	8280	0.73	11.2	3.6	89	98	7.0	38.0	17.1	33.0	2.4			
1368	132	0.8	8.59	4.25	6440	1.16	23.1	3.2	73	98	7.0	41.0	30.1	30.0	2.3			
1372	124	1.0	8.70	4.23	5530	1.61	21.9	3.1	67	98	7.1	46.0	42.6	300	4.6			
1312	130	0.8	8.67	4.20	5250	1.18	19.6	3.6	65	98	7.0	49.1	48.0	24.0	1.4			
			8.94	4.24		1.39	19.4			97		45.6	43.3	24.0				
			8.86	4.27		0.76	18.0			97		40.3	37.6	18.0				
1436	132	2.0	8.64	4.32	6210	0.76	17.3	2.7	85	97	7.1	36.7	38.3	24.0	2.4			
1724	93	1.2	8.82	4.26	7750	0.49	17.5	4.4	59	97	7.8	44.0	40.2	21.0	1.9			
1824	88	1.0	8.75	4.31	7930	1.23	18.7	5.8	72	97	7.2	47.4	54.2	39.0	1.4			
1576	108	1.0	8.84	4.23	13290	0.52	20.0	2.8	69	97	7.2	49.0	47.6	9.0	0.2			
1768	96	1.6	8.79	4.22	6490	1.01	21.4	3.9	67	97	7.1	51.0	48.8	33.0	2.6			
			8.86	4.20		0.73	27.7			96		48.9	46.6	24.0				
			9.01	4.19		0.86	21.9			97		46.5	43.3	33.0				
1644	91	1.4	8.93	4.25	7630	0.55	24.5	3.9	68	98	7.2	43.3	51.5	39.0	2.4			
1684	95	1.0	8.88	4.29	7210	1.18	33.5	3.8	63	98	7.2	45.5	48.8	33.0	1.2			
1612	99	0.8	8.83	4.30	4570	1.03	25.2	2.4	79	99	6.9	49.1	46.7	30.0	0.6			
			8.65	4.27		0.60	27.3			99		46.2	49.4	33.0				
1332	113	1.6	8.62	4.35	5740	1.29	30.0	3.3	63	97	6.9	56.1	53.5	33.0	1.2			
			8.72	4.24		1.27	30.4			97		50.2	54.3	33.0				
			8.81	4.24		0.79	29.1			97		53.8	55.7	33.0				
1580	95	2.2	8.97	4.82	4370	0.87	29.0	4.6	50	98	7.1	51.9	49.7	30.0	2.2			
1636	98	2.7	8.95	4.20	5130	1.15	28.7	4.8	64	98	7.0	52.9	52.6	24.0	1.2			
			262.74	126.30			715.7					1526.9	1231.9	843.0				
1568	103	1.4	8.76	4.21	6363	0.86	23.9	3.8	68	97	7.1	44.2	41.1	29.1	1.8			
C		C			C			G	G		G			G	G			
12		12			12													

IF BULKING IN WHAT PERIOD None

QUANTITY OF DRY SLUDGE REMOVED None

AGE TEMP. OF RAW SEWAGE 61°

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	45	51
SECONDARY TREATMENT	40	45
OVERALL TREATMENT	85	96

DETENTION TIME -HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.90	1.66	2.41
AERATION TANK	4.04	2.70	3.60
FINAL SETTLING TANK	3.72	2.10	3.11

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			629
FINAL SETTLING TANK			402

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			12577
FINAL SETTLING TANK			10067

EQUIV. POP. TREATED= 49,314
(LBS. B.O.D. RAW SEWAGE ÷0.17)

C. F. AIR/GAL. SEW. TREATED	0.924
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1250
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	31.9

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ___ PAYROLL/MO. $ 4,000.00

ELECTRICITY PURCHASED ___ K.W.H. $ 905.05

GAS PURCHASED ___ C.F. $ 199.81

~~CHEMICALS & SUPPLIES~~ WATER $ 291.52

~~MAINTENANCE~~ Fuel Oil $ 400.00

OTHER OPERATING COSTS $ 456.86

AMORTIZATION COSTS $

PAYMENTS TO DEPRECIATION FUND $

TOTAL $ 6,253.24

COST/M.G. SEW. TREAT. $ 21.94

COST/CAPITA/MO. $ 0.097

COST/1000 LB. B.O.D. REMOVED $ 29.[illegible]

A

SEND TO BRANCH OFFICE
INDIANA STATE BOARD OF HEALTH

MONTHLY REPORT OF OPERATION
SEWAGE TREATMENT PLANT
GUGGENHEIM BIOCHEMICAL TREATMENT

										CHEMICALS USED			RAW SEWAGE			PRIMARY EFFLUENT			FINAL EFFLUENT					AERATION MIXED LIQUOR					RETURN SLUDGE	
DAY OF MONTH	DAY OF WEEK	PRECIPITATION—INCHES	RAW SEWAGE BY-PASSED—M.G.D.	PRIMARY TREAT. ONLY—M.G.D.	COMPLETE TREATMENT—M.G.D.	STREAM FLOW—M.G.D.	5-DAY B.O.D.—P.P.M. UPSTREAM OF S.T.P.	5-DAY B.O.D.—P.P.M. DOWNSTREAM OF S.T.P.	GRIT REMOVED FROM GRIT CHAMBER—CU. FT.	LBS/DAY ALUM	LBS/DAY	LBS/DAY	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	pH	5-DAY B.O.D.—P.P.M.	SUSP. SOLIDS—P.P.M.	DISSOLVED OXYGEN—P.P.M.	RESIDUAL CHLORINE—P.P.M.	SETTLEABLE SOLIDS % IN 30 MINUTES	SUSP. SOLIDS—P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	T				10.3					400			7.0	67	195	7.4	73	49	7.5	16	13	5.8		150	1780	84	1.8	8.82	4.29	4250
2	W				10.6				27	400			7.1	127	115	7.2	33	40	7.4	17	11	5.8		150	1548	97	2.6	8.70	4.25	5290
3	Th				11.1					400			6.9	21	171	7.1	46	93	7.2	15	1	6.6		150	1320	114	2.8	8.74	4.23	11320
4	F				9.4				27	400																		8.77	4.31	
5	S				8.2					400																		8.85	4.25	
6	Su				8.0					400			7.1	99	68	7.1	70	34	7.2	21	3	4.0		160	1484	108	1.6	8.72	4.11	5210
7	M				9.7					400			6.9	124	90	7.3	63	50	7.3	13	8	5.2		150	1524	98	1.8	8.74	4.25	4380
8	T				9.2					400			6.9	55	87	7.2	36	44	7.2	14	10	5.8		170	1656	103	2.8	8.79	4.29	3340
9	W				9.2				27	400			7.0	231	360	7.4	50	46	7.5	19	1	6.4		150	1512	99	2.0	8.87	4.22	4260
10	Th				12.7					400			7.0	77	103	7.2	74	54	7.5	15	2	5.4		140	1404	98	3.6	8.82	4.37	3630
11	F				13.2					400																		8.66	4.22	
12	S				11.2					400																		8.81	4.30	
13	Su				10.6					400			7.0	113	83	7.2	70	63	7.3	18	5	5.8		140	1628	86	5.0	8.61	4.32	5970
14	M				11.1				27	400			7.0	83	93	7.0	56	53	7.2	16	17	6.6		140	1492	94	3.6	8.86	4.26	6860
15	T				11.2					400																		8.82	4.18	
16	W				11.3				27	400			7.0	189	126	7.1	78	80	7.2	16	4	5.0		160	1276	125	3.0	8.74	4.13	5930
17	Th				9.9					400			7.2	148	181	7.0	84	63	7.2	17	5	4.6		160	2468	65	1.8	8.99	4.12	4270
18	F				10.2				27	400																		8.66	4.24	
19	S				9.9					400																		9.60	4.19	
20	Su				9.1					400			7.2	62	129	7.2	68	30	7.2	12	9	5.2		140	1690	83	2.8	9.56	4.25	5510
21	M				10.6				14	400			7.2	121	130	7.3	73	34	7.2	13	6	6.4		130	1536	85	2.2	9.68	4.14	5540
22	T				10.5					400			7.2	58	121	7.1	101	44	7.3	15	4	6.0		140	1484	94	1.6	8.96	4.14	6210
23	W				10.5				14	400																		8.95	4.18	
24	Th				10.8					400																		8.52	4.13	
25	F				9.2					400																		8.82	4.27	
26	S				9.3					400																		8.88	4.19	
27	Su				9.0					400			7.2	98	73	7.2	99	40	7.3	16	10	5.6		150	1492	101	1.2	8.88	4.26	4240
28	M				10.2				54	400			7.3	183	54	7.5	83	68	7.5	16	8	7.0		150	1620	93	1.0	8.80	4.22	5730
29	T				10.9					400			6.9	194	139	7.3	98	46	7.3	20	10	6.8		150	1616	93	1.4	8.72	4.16	5550
30	W				9.5				27	400			7.2	121	110	7.0	85	43	7.3	19	7	5.6		140	1528	89	1.6	8.72	4.16	5220
31	Th				10.4					400																		8.46	4.19	
TOTAL					317.3				271					2171	2428		1340	676		308	134				30100	1509	46.5	215.60	130.82	104710
AVERAGE					10.2					400			7.1	114	128	7.2	71	51	7.3	16	7	5.8		148	1584	95	2.5	8.57	4.22	5511
TYPE OF SAMPLE ANALYZED*													c	c	c	c	c	c	c	c	c	c		c	c		c			c
NO. OF PORTIONS COLLECTED DAILY													12	12	12	12	12	12	12	12	12	12	1	12	12		12			12

*C—COMPOSITE; G—GRAB.

APPEARANCE OF ACTIVATED SLUDGE GOOD

NUMBER OF SLUDGE BEDS CLEANED OR HRS. VACUUM FILTER RUN NONE

WEATHER CONDITIONS AVER. 27.4° HI. 48° LOW 2°

OTHER REMARKS MAINTENANCE HIGH, WE TOOK DIGESTER #1 OUT OF SERVICE FOR REPAIRS — RUPTURED LINE

IF BULKING, IN WHAT

QUANTITY OF DRY SLU

AVERAGE TEMP. OF RA

B

907

OPERATION
T PLANT
L TREATMENT

REPORT FOR EAST CHICAGO, IND. (CITY)

FOR MONTH OF DECEMBER 1964

SIGNED BY [illegible]

AERATION						SLUDGE DIGESTION												
MIXED LIQUOR				RETURN SLUDGE														
SUSP. SOLIDS—P.P.M.	SLUDGE INDEX	DISSOLVED OXYGEN—P.P.M.	AIR USED IN AERATION MILLION CU. FT.	VOLUME—M.G.D.	SUSP. SOLIDS—P.P.M.	WASTE ACT. SLUDGE TO DIGESTER—GAL. X1000	RAW SLUDGE TO DIGESTER—GAL. X1000	TOTAL SOLIDS IN RAW SLUDGE—%	TOTAL VOL. SOLIDS IN RAW SLUDGE—%	TEMPERATURE IN DIGESTER °F.	PH IN DIGESTER	GAS PRODUCTION CU. FT. X 1000	GAS USED CU. FT. X 1000	SUPERNATANT WITHDRAWN—GAL. X 1000	SOLIDS IN SUPERNATANT—%	SLUDGE WITHDRAWN GAL. X 1000	TOTAL SOLIDS IN DIGESTED SLUDGE—%	TOTAL VOL. SOLIDS IN DIGESTED SLUDGE—%
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
1780	84	1.8	8.82	4.29	4250	0.32	23.9	3.7	61	98	7.2	56.5	47.2	6.0	2.0			
548	97	2.6	8.70	4.25	5290	0.63	20.9	3.2	60	98	7.1	50.0	56.5	24.0	1.6			
320	114	2.8	8.74	4.23	11320	0.90	17.7	2.8	44	98	7.2	52.0	56.7	24.0	0.8			
			8.77	4.31		0.35	19.3			97		48.6	43.5	30.0				
			8.85	4.25		0.87	18.2			95		39.0	34.0	24.0				
484	108	1.6	8.72	4.11	5210	1.03	29.9	3.7	67	95	7.0	44.6	53.9	24.0	3.9			
524	98	1.8	8.74	4.25	4380	0.41	22.3	3.4	50	98	7.1	47.0	55.5	21.0	4.0			
656	103	2.8	8.79	4.29	3340	0.33	18.1	3.2	47	98	7.1	40.9	31.4	21.0	4.3			
512	99	2.0	8.87	4.22	4260	1.20	21.0	4.6	64	95	7.3	44.0	50.4	18.0	3.8			
404	98	3.6	8.82	4.37	3630	0.34	18.1	4.6	71	96	7.2	43.1	32.0	21.0	4.1			
			8.66	4.22		0.48	21.2			96		45.6	44.1	21.0				
			8.81	4.30		0.64	19.9			97		48.8	51.1	21.0				
628	86	5.0	8.61	4.32	5970	0.98	18.1	3.4	41	98	7.2	58.4	55.7	21.0	0.2			
492	94	3.6	8.86	4.26	6860	0.44	23.6	3.4	59	98	7.0	42.5	46.4	24.0	1.4			
			8.82	4.18		0.47	20.0			97		46.0	48.5	21.0				
376	125	3.0	8.74	4.13	5930	1.34	24.6	4.2	71	97	7.0	48.0	44.9	27.0				
168	65	1.8	8.99	4.12	4270	1.19	18.2	4.5	75	97	7.0	39.2	37.5	30.0	1.2			
			8.66	4.24		0.37	23.0			98		37.1	36.3	21.0				
			9.50	4.19		0.62	19.3			98		42.3	43.2	1.0				
390	83	2.8	9.56	4.25	5510	0.51	21.7	2.8	78	97	7.0	35.2	28.7	33.0	0.7			
536	85	2.2	9.68	4.14	5540	1.08	22.4	4.7	33	97	7.0	37.7	44.9	30.0	0.6			
484	94	1.6	8.96	4.14	6210	0.54	18.3	4.4	65	97	7.0	41.8	34.8	27.0	0.2			
			8.95	4.18		1.53	24.3			97		48.5	37.0	24.0				
			8.52	4.13		1.79	19.2			97		48.0	41.6	24.0				
			8.82	4.27		0.69	18.3			97		40.0	40.4	18.0				
			8.88	4.19		0.87	18.0			98		38.9	47.1	27.0				
492	101	1.2	8.88	4.21	4240	0.37	30.0	5.1	56	97	7.0	39.1	41.1	30.0	1.8			
20	93	1.0	8.80	4.22	5730	0.72	22.1	4.7	54	96	7.1	44.5	38.4	0.0				
16	93	1.4	8.72	4.16	5550	1.15	24.0	4.5	61	95	7.0	43.4	42.3	24.0	2.2			
528	89	1.6	8.72	4.16	5220	0.84	22.6	3.9	75	95	7.0	37.8	30.2	24.0	2.9			
			8.76	4.19		1.35	23.3			98		49.2	59.0	24.0				
00	1509	46.5	265.60	130.82	104710	24.37	656.5					1370.1	1349.3					
584	95	2.5	8.57	4.22	5511	0.79	21.1	3.5	6.0	97	7.1	44.2	43.5	24.4	2.1			
c		c			c			G	G		G			G	G			
12		12			12													

IF BULKING, IN WHAT PERIOD NONE

QUANTITY OF DRY SLUDGE REMOVED NONE

AVERAGE TEMP. OF RAW SEWAGE 55°

— RUPTURED LINE NOT REPAIRED BECAUSE OF ADVERSE WEATHER CONDITON

SUMMARY DATA

PERCENT PURIFICATION	B.O.D.	S.S.
PRIMARY TREATMENT	38	68
SECONDARY TREATMENT	48	27
OVERALL TREATMENT	86	95

DETENTION TIME—HOURS	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK	2.95	1.74	2.28
AERATION TANK	3.82	2.80	3.41
FINAL SETTLING TANK	3.62	2.20	2.87

SURFACE FLOW RATE GAL./SQ. FT./DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			676
FINAL SETTLING TANK			432

WEIR OVERFLOW RATE GAL./FT. OF WEIR/DAY	MAX.	MIN.	AVE.
PRIMARY SETTLING TANK			13528
FINAL SETTLING TANK			10828

EQUIV. POP. TREATED— 57,067
(LBS. B.O.D. RAW SEWAGE ÷ 0.17)

C. F. AIR/GAL. SEW. TREATED	0.837
C.F. AIR/LB. B.O.D. REMOVED IN SECONDARY TREATMENT	1033
LBS. B.O.D. APPLIED TO AERATOR PER 1000 C.F. AERATOR CAP.	27.6

GARB. TO DIGESTER—% TOT. SOLIDS	
GARB. TO DIGESTER—% TOT. VOL. SOL.	
LBS. GARB. T.S./DAY TO DIGESTER	
LBS. GARB. T.V.S./DAY TO DIGESTER	
TOT. LBS. VOL. SOL./DAY TO DIGESTER	
C.F. GAS PROD/DAY/LB. V.S. ADDED	

MAN DAYS AT PLANT ____ PAYROLL/MO. $ 4,000.00

ELECTRICITY PURCHASED ____ K.W.H. $ 1,333.10

GAS PURCHASED ____ C.F. $ 644.93

WATER $ 299.60

MAINTENANCE $ 1,307.99

OTHER OPERATING COSTS $ ____

AMORTIZATION COSTS $ ____

PAYMENTS TO DEPRECIATION FUND $ ____

TOTAL $ 7,585.53

COST/M.G. SEW. TREAT. $ 23.93

COST/CAPITA/MO. $ 0.133

COST/1000 LB. B.O.D. REMOVED $ 29.52

REVENUE RECEIVED $ ____

MR. LEAHU: Are there any questions?

MR. KLASSEN: Yes, one phrase that you used, Mr. Leahu, interests me.

You said the sewage treatment effluent has better characteristics, as I recall your statement, than the water out in the lake.

Do you want to amplify on that just a little bit? What do you mean by "better characteristics"?

MR. LEAHU: Better characteristics in respect, Mr. Klassen, judging from the Gary-Hobart Water Company, the most probable number counts on coliforms coming into the raw water intake -- the average in the neighborhood of 288 on the most probable number -- we average 7.2. Another thing, our suspended solids are at a very low level. We do not have to have heavy waste material such as rags, lumber, garbage that is dumped out by boats on the lake and things such as that.

We have no fish coming out of our effluent which also can clog an intake water pipe of a water treatment plant.

MR. KLASSEN: This statement, I was trying to correlate with one that the Mayor made -- that the bathing beaches in the lake are never closed. Do we conclude from that that it is safer to swim in the effluent of your sewage treatment plant than out in the lake?

MR. LEAHU: Presently, yes.

(Laughter.)

MR. KLASSEN: Thank you.

MR. POOLE: Bear with us just a little longer.

I am going to call on Mayor A. M. Katz of Gary at this time. Mayor Katz.

MAYOR KATZ: Mr. Poole, Mr. Chairman, distinguished conferees, ladies and gentlemen, I suppose it might be said that the bellicose mayor has already testified and the docile one is about to testify, but I do think that Mayor Nicosia has pointed out a matter that was of great concern to us in northern Indiana, the apparent lack of the presence of many of the industries in the City of Chicago, their presence here to testify as to their particular problems and, of course, a study of the agenda that has been distributed would certainly give ground to the fears that we had.

However, the explanation has been given and I trust that they will be held to account for their distributive share of the pollution that I think all of us in all truthfulness realize does exist.

I would like to take this opportunity to congratulate this committee on its efforts to assemble pertinent information relative to the conservation of one of man's most essential elements, water.

It is necessary for the future welfare of our nation and its people, that a program for the preservation of our Nation's water supply be developed and implemented, and in order to bring this about, procedures such as we are involved in today, are essential and necessary. This effort is to be applauded by all -- for from efforts such as this, the problems of communities throughout America are being focused into their proper perspective.

If it were not for the efforts of the Muskie Hearings of 1963, and the assistance which became available as a direct result of those hearings, I am sure, the strides now being made in air pollution control would still be discussed in terms of future action.

Historic data as to man's needs for water for his own personal use, and of the need for water for the growth and development of our industrial and business community is well known.

What we are and should be concerned with today, is the development and implementation of action, both immediate and long-range, for the abatement of man's negligence in the treatment of his water supply, and the abatement of the abuse of man's water facilities.

I represent the City of Gary, Lake County, Indiana, the largest industrial community located in Northern Indiana. Our greatest asset is our location at the southern tip of Lake Michigan, which represents our single source of water supply. Without this supply of water our community could not support its citizens, nor could it sustain its industries. The protection and the safeguarding of our supply of water is of prime importance to our community.

We are a city of over 178,000 people who respect our neighboring communities, and try to the best of our ability, to control the treatment of waste waters from our City into the common carrier.

We are proud of our city and its industries; we are also aware of our failures and limitations in the control of water pollution. We have done much, as I will explain later, yet we know there is much more to be desired in total control of wastes.

All the sewage of the City of Gary is handled by the Gary Sanitary District. The Gary Sanitary District is a municipal corporation constituted by authority of the original Sanitary District Act of 1917. It was organized in 1938, and the first meeting of the Board of Sanitary Commissioners was held on May

16,1938.

Prior to that date, considerable work had been done by the City Engineering Department in developing plans for sewage disposal in the City of Gary.

A Sanitary District is established for specific purposes -- to collect liquid wastes, and to bring these wastes through intercepting sewers to a treatment works. After treatment, these wastes can be discharged into a drainage outlet without polluting the outlet or causing a nuisance. To state this more precisely, a Sanitary District is administered solely to protect public health.

Gary, being a second class city, has a Board of Sanitary Commissioners, three in number. The City Engineer is a member of the Board by virtue of his office. The other two members are appointed by the Mayor. All members are appointed for four years except the City Engineer, whose term is concurrent with that of the Mayor. No two members' terms of office expire in the same year.

Under the Sanitary District Act, the Board of Sanitary Commissioners has broad powers. It can hire engineers, attorneys, levy taxes for operational expenses, and issue bonds to carry out construction projects in connection with its responsibilities. It also has the power of eminent domain. The Board has exclusive authority to expend district funds. Bonding power was originally limited to two percent of the assessed valuation of a district. Later this was raised by legislative acts to four percent, then to six percent, and finally to eight percent, where it stands at the present.

In May 1938, the Board was organized. Plans were completed rapidly. Contracts were awarded and construction work began on interception sewers and on the main treatment plant. The city was fortunate in obtaining a Federal Grant covering forty-five percent of the cost of the work, not including the cost of the plant site. This grant amounted to $2,166,133.00 and the district issued the first bonds in the amount of $2,65[illegible] 000.00.

Work completed under this construction program included the main treatment plant, rehabilitation of the Miller Plant, Marquette sewage lift station and main interceptor sewer from Alley 9 East to the main treatment plant.

Also, a small interceptor sewer from Colfax Street to the main treatment plant, Pierce Street interceptor system, 16th Avenue interceptor, 25th Avenue relief sewer, a crossing over the Little Calumet River, Side interceptor in Massachusetts Street from 42nd Avenue south to 52nd Avenue. Eighteen general contracts were awarded for the various units noted and were completed at a total cost of $4,371,579.50. The treatment plant was formally accepted and placed into operation in August 1940, approximately fifteen months after start of construction.

With completion of the work noted above and with the issuance of $2,652,000.00 in bonds, remaining bonding power was only approximately $32,000.00. It was impossible to consider any further construction until a reserve had been built up in the bonding power. With the increase of the bonding power from two percent to four percent, it was possible to start planning additional sewer capacity.

In 1955 bonds were issued in the amount of $2,250,000.00 and these funds were used to construct the Rhode Island relief interceptor and South Broadway relief interceptor. As noted heretofore, bonding power was increased successively until the present level of eight percent was reached. These increases enabled the Gary Sanitary District to maintain an almost continuous construction program, building sewage lift stations as well as sewers, and to expand the capacity of the main treatment plant. Pages 10 and 11 indicate the bonds issued by the Gary Sanitary District to date, showing dates of issuance, amount of each issue, and a description of the work completed with these funds.

Total bonds issued to date total $28,660,000.00 and at present the reserve bonding power is between two and three million dollars.

Page No. 12 of this report shows results obtained for the year 1963 in the removal of suspended solids in the main treatment plant. Page No. 13 indicates results obtained in reducing a five-day biochemical oxygen demand. We use data from 1963 as this is the latest year for which such data was available. The main treatment plant went on primary treatment in 1964 with the full knowledge and approval of the Indiana State Board of Health.

It will be noted that the average removal of suspended solids for the year 1963 was 98.26 percent. Suspended solids in the final effluent, annual average was 11.6 PPM. Five-day biochemical oxygen demand reduction was as shown on page no. 13. These results were obtained without chlorination.

There is presently under construction at the main treatment plant, a chlorinating assembly which will permit chlorination of the final effluent. This is financed by a portion of a $4,590,000.00 bond issue. Cost of this project is $355,000.00. With this assembly completed, sterilization of final effluent will be effected. This addition gives the City of Gary a completely integrated sewage treatment works.

The Gary Sanitary District is proud of its record of performance in the years that the main treatment plant has been in operation. The tremendous expansion of the services rendered by the District, the growth of the system, and the continuing extension of the District's facilities to the Gary area, are vivid proof that the Gary Sanitary District has made great progress in the elimination of pollution, and has developed a progressive program of maintaining a high level of environmental sanitation.

The Gary Department of Health has been analyzing the bathing beach waters of the City of Gary for the past six years. These determinations were for the purpose of evaluating and comparing the quality of the bathing beach area to acceptable surface water standards.

The methods used are the prescribed standard methods for determining coliform densities and reporting them as MPN of coliform per 100 ml. In addition to this, our laboratory has run total bacterial plate counts as a secondary control. These determinations are all biological in nature, as these have been the limits of laboratory facilities.

Our results have thus far been satisfactory, as our analyses show, a vast majority of the samples collected and analyzed have less than 1000 coliform per 100 ml.

During the past four years, in cooperation with the Indiana State Board of Health, the Cities of Hammond, East Chicago, Michigan City, and the Porter County Health Department, we have coordinated a study of the biological quality of the lakefront waters from the Indiana-Illinois state line to the Michigan state line. The primary purpose is to give the participating agencies, an opportunity to evaluate an overall picture of the lakefront. Also included in this report is a copy of the 1964 results, pages 15 and 16.

We have noticed a decided increase of algae over the years accumulating on our bathing beaches. Many complaints are received during the summer months of "oil slicks" in the water. We have noted some game fish washed on our shores, and you may remember the sea gull incident of three years ago.

Our facilities at the present time are

not equipped to do more than the basic bacteriological studies. We do no chemical or sediment analysis of the water in our area. We have done no chemical analysis of the rivers which pass through our city. We are aware of these limitations and are studying possibilities of expanding our laboratory facilities to include this phase of analysis.

As you can determine from this report, we are aware of waste water disposal and the problems it creates in our area. We have made great progress in situations over which we have direct control and consider our Sanitary District an outstanding example of what a city can do in meeting the needs of the community.

At the same time, however, we admit we do have situations over which we cannot report at the present time, nor over which we have any control -- problems created by industrial wastes. We can only accept the report issued by the Health, Education, and Welfare Department that these do exist and to what degree.

It is my intention in the very near future, to appoint an Advisory Committee to investigate the problem of water pollution within the City of Gary, and to advise as to action or legislation which might

(Text continues of Page 926)

BONDS ISSUED BY THE GARY SANITARY DISTRICT

Date Purchased	Series	Issued	Amount	Purpose
12/1/38	1938	Sewer Bond	$ 2,652,000.	Original Bond Issue. Construction of Main Plant, Main Interceptor Sewers, South side interceptor sewers and Pierce Street sewers.
1/1/55	1955	Sewer Bond	$ 2,250,000.	Rhode Island Relief Interceptor and South Broadway Relief Interceptor.
7/1/56	1956	Sewer Bond	$ 4,089,000.	Chase Street Interceptor Sewers.
1/1/57	1957	Judgment Funding	$ 104,000.	
1/1/57	1957	Sewer Bond	$ 720,000.	11th & 19th Avenue laterals to Chase Street Sewer.
12/1/58	1958	Sewer Bond	$ 100,000.	Emergency Sanitary Sewer Repairs Alley 5 South (East Side) and Storm Drainage at Broadway & 51st Avenue.
7/1/59	1959	Sanitary District Bond	$ 3,480,000.	East Side Interceptor Sewer Replacement and South Glen Park Relief Sewer System.
12/1/59	1959	Sanitary Repair Bonds	$ 175,000.	Emergency Sanitary Repairs - Alley 1W & 37th Ave., Alley 1E Wabash R.R. to 6th Avenue and 40th Avenue between Alley 15E and Alley 16E.
1/1/62	1962	Sanitary District Bond	$ 600,000.	Emergency Repairs, Georgetown Relief Sewer System and Pumping Station.

BONDS ISSUED (CONT'D)

Date Purchased	Series	Issued	Amount	Purpose
12/1/62	1962	Sanitary District Bond	$ 9,900,000.	Main Plant Expansion & Modernization, Sewage Lift Station, Miller Storm Water Relief Sewer System & Pumping Station.
12/1/64	1964	Sanitary District Bond	$ 4,590,000.	42nd Ave. Storm Sewer System and Pumping Station, Repairs to 13th Avenue Storm Sewer, Chlorination Facilities and repairs to Marshalltown Pumping Station.

Total Amount of Bonds Issued (Brought Forward)	$ 14,170,000.00
" " " " " (This page)	$ 14,490,000.00
(TOTAL)	$ 28,660,000.00

SUSPENDED SOLIDS AND PER CENT REMOVALS

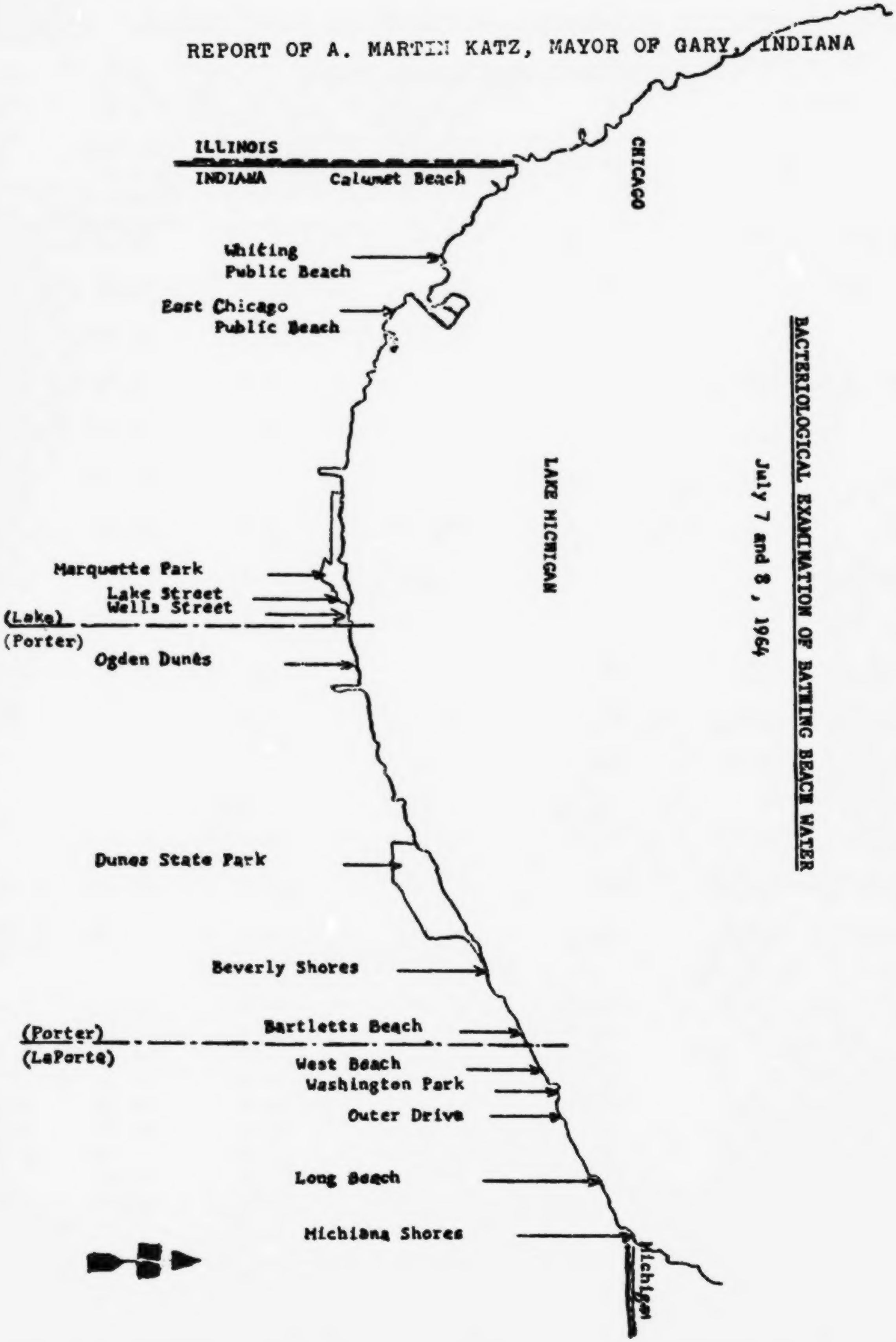
1963

Month	Raw Sewage P.P.M.	Primary Effluent P.P.M.	Per cent Removal Clarified To Raw	Secondary Effluent P.P.M.	Per cent Removal Complete Treatment
January	620.2	153.9	75.19	12.3	98.01
February	480.2	116.2	75.81	15.8	96.72
March	543.9	152.6	71.94	13.8	97.46
April	1006.3	167.2	83.39	14.6	98.55
May	751.3	162.3	78.40	11.4	98.48
June	812.9	195.7	75.93	10.8	98.60
July	622.3	110.7	82.21	6.9	98.87
August	553.6	111.2	79.92	9.4	98.30
September	722.4	151.9	78.97	9.2	98.73
October	708.5	200.5	71.71	10.6	98.51
November	1020.5	359.0	64.82	13.2	98.71
December	642.3	153.2	76.15	11.5	98.21
Average	707.0	169.5	76.20	11.6	98.26
Maximum	1020.5	359.0	83.39	15.8	98.87
Minimum	480.2	110.7	64.82	6.9	96.72
1962 Average	595.9	142.5	76.09	10.8	98.18
1961 Average	550.0	128.8	76.38	12.5	97.70
1960 Average	508.6	144.1	71.66	14.1	97.22
1959 Average	431.2	125.4	70.92	14.8	96.57
1958 Average	467.6	121.9	73.17	13.4	96.97
1957 Average	379.3	131.4	65.37	18.1	95.23
1956 Average	293.9	143.5	51.17	25.3	91.38
1955 Average	213.9	110.2	48.51	12.1	94.47
1954 Average	271.9	111.3	58.44	17.2	92.78

5 Day Biochemical Oxygen Demand

1963

Month	Raw Sewage P.P.M.	Primary Effluent P.P.M.	Per cent Removal Clarified To Raw	Secondary Effluent P.P.M.	Per cent Removal Complete Treatment
January	184.1	86.8	52.83	10.7	94.18
February	153.1	84.8	44.63	12.9	91.60
March	171.5	70.8	58.73	11.4	93.33
April	173.7	80.5	53.67	9.8	94.33
May	165.7	64.1	61.29	5.9	96.47
June	151.0	58.8	61.06	5.9	96.07
July	108.6	45.2	58.42	3.7	96.50
August	126.1	47.7	62.14	4.9	96.14
September	154.3	58.1	62.34	6.6	95.69
October	166.8	73.2	56.10	5.2	96.88
November	184.0	102.6	44.25	4.4	97.58
December	179.6	92.7	48.39	5.6	96.88
Average	159.9	72.1	62.53	7.3	95.47
Maximum	184.1	102.6	62.34	12.9	97.58
Minimum	108.6	45.2	44.25	3.7	91.60
1962 Average	181.8	70.9	61.00	10.7	94.11
1961 Average	225.3	74.0	68.59	13.7	93.82
1960 Average	216.5	82.9	61.72	12.4	94.25
1959 Average	243.4	80.6	66.88	19.0	92.21
1958 Average	342.9	100.6	69.95	18.9	94.75
1957 Average	219.6	92.2	58.02	19.2	81.25
1956 Average	143.7	90.2	37.22	11.5	92.00
1955 Average	108.8	78.4	27.96	11.8	86.94
1954 Average	112.4	69.6	38.27	11.2	88.47



BACTERIOLOGICAL EXAMINATION OF BATHING BEACH WATER

July 7 and 8, 1964

ILLINOIS
INDIANA
Calumet Beach
CHICAGO
Whiting Public Beach
East Chicago Public Beach
LAKE MICHIGAN
Marquette Park
Lake Street
Wells Street
(Lake)
(Porter)
Ogden Dunes
Dunes State Park
Beverly Shores
(Porter)
(LaPorte)
Bartletts Beach
West Beach
Washington Park
Outer Drive
Long Beach
Michiana Shores
Michigan

LOCATION OF SAMPLE	SAMPLE NUMBER	M.P.N.	BACTERIA COUNT
Michiana Shores (Knee Deep)	11782	430	460
Michiana Shores (Waist Deep)	11783	430	520
Long Beach, Stop 31 (Knee Deep)	11784	930	1010
Long Beach, Stop 31 (Waist Deep)	11785	750	700
Outer Drive, Wash. Park (Knee Deep)	11786	930	2100
Outer Drive, Wash. Park (Waist Deep)	11787	2400	1100
Washington Park Beach (Knee Deep)	11788	230	70
Washington Park Beach (Waist Deep)	11789	430	100
West Beach, Mich. City (Waist Deep Only)	5*	930	240
Bartlett's Beach (Waist Deep Only)	6*	750	240
Beverly Shores (Knee Deep)	11790	930	500
Beverly Shores (Waist Deep)	11791	9.10	30
Dunes State Park (Knee Deep)	11176	210	870
Dunes State Park (Waist Deep)	11177	9.10	840
Ogden Dunes, East Bndy. (Knee Deep)	11178	430	3280

LOCATION OF SAMPLE	SAMPLE NUMBER	M.P.N.	BACTERIA COUNT
Ogden Dunes East Bndy. (Waist Deep)	11179	430	2700
Lake Street Beach (Waist Deep)	11184	430	2310
Lake Street Beach (Knee Deep)	11185	430	1700
Wells Street Beach (Waist Deep)	11186	930	1950
Wells Street Beach (Knee Deep)	11187	430	2900
Marquette Park Beach (Waist Deep)	11182	430	660
Marquette Park Beach (Knee Deep)	11183	230	750
East Chicago Public Beach (Knee Deep)	11190	430	18,760
Whiting Public Beach (Knee Deep)	11189	750	98,400
Hammond Beach (Knee Deep)	11188	2400	T.M.C.

* These Samples Examined in Michigan City Health Department Laboratory.

be necessary in controlling the indiscriminate disposal of liquid wastes.

We, in the City of Gary, seek a cooperative solution with our industries to the mutual problem of industrial wastes. We realize fully our obligations, and I am sure, an amicable solution will be found.

This, gentlemen, concludes my report. I again thank you for your efforts and your interest in this matter, and may you be successful in your efforts to preserve the water of the United States for the use of future generations of Americans.

Thank you.

(Applause.)

CHAIRMAN STEIN: Thank you. Thank you, Mayor Katz.

Please wait a minute and let me ask if there are any comments or questions.

MR. KLASSEN: Yes, I wanted to ask the Mayor a couple of questions here, maybe to amplify what is in the report.

In the report here, Mayor, I did not find it but I think it was in the Indiana Board and the Public Health Service Report, the capacity of your treatment plant, primary. So far, it was 80 million gallons.

MAYOR KATZ: Eighty million gallons per day.

MR. KLASSEN: Have you ever been up to capacity? Have you ever put a capacity flow through your primary treatment plant?

MAYOR KATZ: I have the Superintendent of that plant with me today, Mr. Matthews.

Can you answer the question?

MR. MATTHEWS: Yes, we have not put the full capacity through yet because our complete construction program is just in the final hookup, and, as an example, some of the subcontractors have some little connections to make.

But previously, on the design of 40 million gallons per day, I pumped 58 million gallons through the 40 million gallon plant.

MR. KLASSEN: What is the maximum flow that you have put through your primary units?

MR. MATTHEWS: The primary units?

MR. KLASSEN: Yes, I understand they are 80 million gallon capacity. I am wondering what the maximum flow is you put through there.

MR. MATTHEWS: I wouldn't know because we haven't had a chance to try it out yet.

The reason-- we have doubled our first capacity of 40 million. I have put 58 million through those four first primary tanks, but I have never been hooked up with enough pumps yet to see how much we can put through the entire primary treatment plant.

MR. KLASSEN: Well, in other words, your primary treatment plant of 80 million gallons capacity is not in operation at the present time?

MR. MATTHEWS: No, sir, only singly.

MR. POOLE: What is your daily sewage flow? It is not anything like 80 million

MR. MATTHEWS: We are --- right now, due to the extended drought periods in this part of the country, we have been experiencing for some years, our flow is around 30 million gallons per day, right now, complete.

MR. KLASSEN: Well, what I am leading up to is the next question that concerns the State of Illinois, particularly.

When do you start bypassing and where do you start bypassing at times of rain. Apparently, you are not taking the full flow from your primary plant and your overflow from your combined sewers. You are going to someplace without treatment.

MR. MATTHEWS: Well, sir, that is handled in this way: We have Brown and Brown regulators, and where the large trunk sewer is connected to our interceptors, those work automatically, but they never close off entirely and we take enough sewage, all we can; but there is no positive figure that I could give you, after operating there 25 years, where you start to bypass your float chambers,you know.

Your problem -- you are probably familiar with the Brown and Brown gauge. As the water level rises in the sewage, the gate tends to close off and there you have it, but I say, we have not had the opportunity yet.

We have 162 million gallons capacity in raw sewage pumps in the plant hooked up right now and we will never be short of pumpage capacity.

MR. KLASSEN: I am not as concerned about the pumping capacity as I am concerned about using your treatment plant to its maximum capacity at time of rain so that you minimize the amount of combined sewer overflow in the streams that go into the State of Illinois.

MR. MATTHEWS: That will be determined a little later. As I said, we are not hooked up to use the total capacity right now. We do know we have 80 as a minimim there.

MR. KLASSEN: Well, I guess that is as good an answer as I can get. But it is not too satisfactory, in view of the glaring reports that were given here of everything that Gary has done and that you are expending every effort to protect the waters.

Now, you tell us you don't know how much you can take and you are not hooked up to take it and if this is what you want to go in the record, this is --

MAYOR KATZ: Well, we are also telling you what we have under construction and will be able to do when this construction is completed.

You are looking for results from something that isn't completed yet.

MR. KLASSEN: All right. Then that is the answer.

When will it be completed?

MR. MATTHEWS: Probably in June.

MAYOR KATZ: I believe the chlorination plant will be completed in June also, is that right?

MR. MATTHEWS: Well, I couldn't say chlorination. He is talking about.

MR. KLASSEN: Mayor, I want to get --

MR. MATTHEWS: To give you another answer, we have treated in that 40 million gallon plant which in '38 was designed as an equivalent population load of 175,000, I have carried over a half a million on six out of ten areas, equivalent population loading there.

But we are taking care of considerable pollution so as you know, when you carry a load like that, and more than once, because we had the opportunity to treat a very strong sewage, up over 500 parts per million in the chlorofier.

MR. KLASSEN: Well, do you anticipate, then, when your plant is all completed and everything is the way it is laid out here, what percentage of your wet weather flow will be taken to the plant before you start bypassing?

This is what I am coming to.

MR. MATTHEWS: I am going to give you an answer. I made a computation that if all the main trunk sewers were flowing full, 24 hours a day, the discharge into the river would be one billion gallons, round figures.

Now, we have got 80 million capacity. You make your own answer to that one yourself.

MR. KLASSEN: I am asking you the question. I am not giving you your answers. You answer it.

MR. MATTHEWS: Because you can't answer it.

MR. KLASSEN: Well, all right, you can't answer it.

If you can't then, I am not -- I don't know your facts.

One other thing: Have you ever considered taking all of the wastes from U.S. Steel? I understand that you take the sanitary wastes. How about the other wastes that we have indicated here in the report?

That is, has the city ever given this consideration?

MR. MATTHEWS: We have given it enough consideration that if we took all the pickling liquor through our plant, we'd be out of business, that one item. So we don't take any of it.

MR. KLASSEN: All right, that is all I have.

CHAIRMAN STEIN: May we have your first name for the record, sir?

MR. MATTHEWS: Sir?

CHAIRMAN STEIN: May we have your first name?

MAYOR KATZ: William, William Matthews.

MR. MATTHEWS: William Matthews.

MR. KLASSEN: By the way, one other question here: When is the last time you constructed combined sewers, new combined sewers in Gary? What year?

I'm particularly interested in a combined sewer that is taking new flow, not necessarily an interceptor. I am interested in the extension of the Gary sewer system, whether it is on purely the separate or the combined plan and this is why I was asking my question.

When is the last sewer extension on the combined plan that you made in Gary?

MR. MATTHEWS: I believe it is 1959, but I am not -- I ought to be able to answer that question, but remember, consulting engineers come in and handle that construction work and I am operating. I have nothing to do with the consulting engineer's program.

MAYOR KATZ: My recollection would be 1960, Mr. Matthews.

MR. MATTHEWS: How much?

MAYOR KATZ: 1960.

MR. MATTHEWS: 1960.

MR. KLASSEN: In other words, as late as 1960, you were still building combined sewers in Gary?

MR. MATTHEWS: Yes, sir.

CHAIRMAN STEIN: Are there any further comments or questions?

MR. POSTON: I'd like to make a comment to the effect that it has been very difficult for me to understand the expenditures of large amounts of money for construction of waste treatment works and then, when it becomes necessary to do some maintenance or repairs, there isn't a provision to provide temporary treatment.

I think water pollution control works are one of the utilities which do not try to maintain a continuous service, and I know of many cases where there have been results which have caused a great commotion.

I am thinking of the construction of new plants, water utilities, they don't shut down their operation to wait for another day. They don't quit serving their customers, the telephone utilities, the power and light utilities all maintain continuous service, and I think it should be expected from the water pollution industry, the control industry, to provide similar service to maintain water quality and maintain clean water.

MAYOR KATZ: Are you speaking specifically or generally, sir?

MR. POSTON: This is generally, and I think it applies in most cases of sewage treatment works, when they build a new works, they will start to bypass a plant that is then doing a job, maybe sometimes for months, until they can get new construction under way.

I think that provisions can be made and should be made to continue this operation so that you don't provide additional pollution loads to our streams.

CHAIRMAN STEIN: Do we have any further comments or questions?

If not, thank you very much, Mayor Katz. We were very happy to hear from you.

CHAIRMAN STEIN: Judging from you and the style of your other Mayor, I don't think anyone in Indiana is being shipped today.

(Laughter.)

MAYOR KATZ: I don't think so either, but perhaps the attempt was started.

CHAIRMAN STEIN: I don't think there was any attempt, either.

I think we will stand recessed for lunch until a quarter after two.

(Applause.)

(Whereupon, the meeting was adjourned until 2:15 o'clock p.m., this date.)

AFTERNOON SESSION

CHAIRMAN STEIN: May we reconvene?

I wonder if we may ask Mr. Miller to get up again and resume and see if we have any comments or questions.

MR. KLASSEN: I just wanted to ask Mr. Miller a question or two.

The report indicates the kind of progress that we knew resulted from your Board's action in Indiana, and I am sure that you undoubtedly have the same problem, the problems that we do in Illinois, and I just wanted to ask you about the operation of these facilities.

There is nothing in the report to indicate, first of all, that the facilities are operating and this isn't too far-fetched because we have found this in Illinois where facilities have been put in and when your back is turned, they don't operate them.

I just wondered whether you are receiving monthly operation reports from these various plants that you have listed here in your very complete report?

MR. MILLER: We do not receive operation reports for all of the plants that are listed in the report; but by and large, from the large industries, we do receive these reports, particularly on the facilities that have been installed in recent years.

We don't have them complete for all sewers that may be in the plant.

MR. KLASSEN: That is the only thing I want to ask Mr. Miller.

CHAIRMAN STEIN: Do you have some further questions?

MR. KLASSEN: No.

MR. POSTON: I would like to ask Mr. Miller if he would feel free to share these industrial and municipal waste treatment plant reports, the amount of waste discharged to the stream, quantities and so forth, with us in the Public Health Service, Department of Health, Education, and Welfare?

MR. MILLER: Wally, I think -- do you want to answer?

(Laughter.)

MR. KLASSEN: This is the advantage of having your boss here.

(Laughter.)

MR. MILLER: Wally, I would say that the operation reports that we have are generally sent to us in a classified basis, confidential, and as such, we have them for review, but I am not able to give them to you for your use.

This is not true of all of them, but it is true of a large share of them.

MR. POSTON: I would assume, then, that at a later date, it will be up to Indiana municipalities and the Health Department to show progress if there's any progress made at some future date.

We want to know what accomplishments have been made. It will be up to them to show this progress.

MR. MILLER: Yes, except that I might say that on the municipal plants, they are required to submit operation reports. These are open files.

They have given this information to us in the past and will continue to do this.

The only thing I would say, I think the proof of the pudding should be in the eating and we should be able to tell the accomplishments by stream sampling and monitoring, and I would hope that we would get to the point in this wherein you might not need the individual outfall data.

MR. POSTON: Well, I feel it is very difficult to assess a particular pollution condition unless you know the amounts and kind of wastes being discharged to the stream from specific industries, to make an engineering evaluation of a particular situation.

I think these bits of information are required and would be needed for our technical people to come up with some assessment of progress.

MR. MILLER: I would agree that such data is valuable and needed in an engineering evaluation. But here again, I think the real results and the place where we must make the accomplishment is in the improvement of the overall water quality and this, I hoped we could do.

CHAIRMAN STEIN: Well, I think I can understand this now, because when you talked about the Hammond Sanitary District, the municipality on page 32, you said, "It will return the Little Calumet River flowing into Illinois into a sanitary condition."

While you talked about all the industries, you never said that, and I didn't know whether your admission -- omission of this meant that even though they did this, it wouldn't be in a satisfactory condition, but maybe it's because you got confidential material and you couldn't tell, so we will never know.

(Laughter.)

MR. MILLER: Well, again, I would say to you that it is most difficult on the industrial ones to break them as adequately and inadequately and here again, we operate under the Indiana Stream Pollution Control Law on the principle of maintaining the quality of the water in the receiving waters and not on effluent standards; and for this reason we are concerned with the quality of the water.

CHAIRMAN STEIN: Perry, let me ask you this -- I think we need this for the conferees, and Hayes Black was supposed to come, and I respect you and Hayes in Public Service as much as anyone. Hayes indicated to us that the effluent discharges --- and it seems to me that you have really indicated it also -- are not bad. I wonder if you'd care to expand and clarify that a little because I really think we need guidance on this, Perry.

MR. MILLER: I think the real problem here, as far as I see it, is that there is no question in my mind that the Indiana Stream Pollution Control Board needs this data to assess the problem and to know how to approach the problem, and where the work needs to be done.

We need this further to help us in the approval of new facilities, as they come up, to determine what is doing an adequate job and what is not doing an adequate job.

The other question that I have, and I

say this from a State's viewpoint, we very definitely need this data.

Now, my only question and answer to Wally was that I wondered whether you, in assessing what had been accomplished, needed this data to determine what can be accomplished as far as the watercourse is concerned.

CHAIRMAN STEIN: Well, again I have to say here, Perry, that I have to rely certainly on the technical staff, as you can see by the way that you say you need data and Mr. Black who is our senior industrial ace says we need the data.

Now, the point is: If these are closed files and we do need the data and it is your policy not to release it -- I don't read it necessarily in your law that you have to keep this data secret -- if it is your policy to keep this confidential and Mr. Black says we need it, I hope we can work out a mutual agreement since there have been cases when we just had to spend a lot of public funds.

If our technical people say that this data is essential then they must get boats and get outside the outfall pipes and keep taking the samples until we get the needed information. Now, it would seem to me that a proper husbandry of public funds should permit the free flow of data, and I am not talking about trade secrets or going back into the plant or rummaging in the files and trying to get secret information; I am talking about effluents that come out of the pipe into public waters. I think that our technical people say we have to have that and this is not going to be made available by Illinois -- or Indiana -- Illinois has always made it available.

(Laughter.)

If this is not going to be made available by Indiana, we are just going to have to go out and get it, and the trouble is it is going to cost us a lot of money and that is your money as well as ours.

MR. POOLE: May I get into this argument?

CHAIRMAN STEIN: Yes.

MR. POOLE: We have certain confidential data. I will admit to all of you here that Mr. Miller knows more about the number of plants that have submitted it than I know.

I have the impression that it was a relatively small group of industries when you consider the total group of industries.

Our policy has been that information that is submitted to us in confidence is kept that way. On the other hand, I hope to lean pretty heavily on the Chairman's view that anything that goes into public waters ought to be available to anybody that has got a real interest or a right to inquire about those public waters.

Now, we do debate this thing. It's been done in other conferences, the rest of the afternoon, but I would like to say to you, Mr. Stein, that if it is one of the conclusions of this conference and it has been recommended by H.E.W. that effluents data be submitted and maintained in open files, we do the very best we can to make an adjustment with the people that have been giving us data in confidence in the past so that the future data will be maintained in open files.

CHAIRMAN STEIN: Thank you.

MR. KLASSEN: I just want to give you our philosophy here.

My own philosophy about this question of operation reports--we feel that the waters are the property of the people and certainly the public. The people, have a right to know how their property is being used and what is being misused, and we have been fairly successful in carrying out this philosophy; but this is the basis on which we justify the fact that we should know -- the people have a right to know, the public has a right to know -- how their property is being used and that it is not being misused.

CHAIRMAN STEIN: Thank you.

Are there any further comments or questions of Mr. Miller's presentation?

MR. KLASSEN: I have a couple more.

I read your report here and followed it, Mr. Miller, with a good deal of sympathetic understanding because after all, Illinois and Indiana have many mutual problems; and while we might operate a little differently, the objective of your organization and ours, we know, is the same.

On page 34, there was a statement here, "Local developers continue to construct combined sewers with outfalls to the Calumet River."

Is there a -- well, first of all, does Indiana permit the construction of new combined sewers with outfalls?

MR. **MILLER**: No. The answer to that is no.

I think part of that was during the litigation. Developers down there continued to build combined sewers.

MR. KLASSEN: Are there means by which steps could be taken that you could put a halt, practically, to this?

I can tell you what has been very successful in Illinois.

When we find such a sewer that is being built illegally, we merely notify the Federal Housing and Veterans Administration not to give any commitments in that area and this usually is more effective than state and court action, because this hitting the pocketbook of the developer and the materials people and the financial people.

And I thought I might pick up some new ideas that you would have. This approach is getting a little threadbare, but it still works.

MR. MILLER: I would say we do the same thing on the subdivisions that come to us. FHA requires approval of these before they construct them, and in this way we do get separate sewers in the subdivisions, and we have been working on this; and the other thing is on plan approval for sewers, these come to the Stream Pollution Control Board and the Indiana State Board of Health, and they require approval of the Board's before they can obtain the financing, and in this way, we have some control over them.

MR. KLASSEN: One other question of a technical interest as well as putting something in here. I think that this is a very complete report.

It is on page 20, the statement, "The lagoon effluents will seep horizontally through 250 feet of slag.

What has been your experience in the material seeping through the brine or this deposit of slag in the way of either picking up material that will increase the pollution or being successful in so-called screening everything out or filtering everything out?

Has this been a successful means of keeping waste contained?

MR. MILLER: I think in this instance we believe that it will be a successful means of containing the waste.

This, I believe, depends upon the nature of the waste, and as we cited in the report with the pickle liquor, this did go through the slag and out into Lake Michigan, so it is dependent somewhat upon the nature of the waste with which you are involved.

MR. KLASSEN: That is all, Mr. Chairman.

CHAIRMAN STEIN: Are there any further comments or questions of Mr. Miller?

Well, thank you very much for a very comprehensive report.

MR. MILLER: Thank you.

CHAIRMAN STEIN: Mr. Poole.

MR. POOLE: Next on the list we have the Merrillville Conservancy District. I believe Mr. G. A. Fort has a very brief report for this district.

MR. FORT: Mr. Chairman, conferees, ladies and gentlemen, this is a report on how a fast growing, unincorporated area has won the fight against pollution from septic tanks.

The purpose of this report is to set forth information relating to the Sanitary Sewer System being constructed by the Merrillville Conservancy District, Lake County, Indiana, with $2,710,000 in bonds, issued by the Merrillville Conservancy District.

The bonds are issued under the provisions of Chapter 308 of the Laws of the State of Indiana, passed at the 1957 Session of The General Assembly, and an ordinance of the Merrillville Conservancy District adopted September 13, 1963, to provide funds to pay the construction cost of the proposed Sanitary Sewer System.

The bonds are direct obligations of the Merrillville Conservancy District, Lake County, Indiana, payable out of unlimited ad valorem special benefit taxes being levied and collected on all taxable real property in the district.

The Merrillville Conservancy District was established on December 28, 1962, by action of the court of Judge Felix A. Kaul, Circuit Court, Lake County, Indiana, and was created for the purpose of providing sewage collection and treatment. The district can be identified as an area of some 3.2 square miles located in Ross Township, Lake County, Indiana, to just north of Highway US 30 and extending east and west of State Road #53, better known as Broadway. The terrain is generally flat to rolling in sections. The area is drained by Turkey Creek which forms the headwaters of Lake George which flows into Lake Michigan.

The project has been approved by the following State agencies:

Flood Control Approval Letter, Dated July 29, 1963;

Stream Pollution Control Board: Dated July 19, 1963;

State Board of Health; Dated July 19, 1963.

Merrillville is an urban community situated in the great industrial complex of Lake County. It, like many other suburban communities, was developed without a central sewage system. Each house is served by its own individual sewage disposal system. Many of these individual systems were designed and constructed without any regulatory control. The Lake County Health Department Septic Tank Ordinance was not passed until the late 1950's.

Many of the homes in this area have inadequate sewage disposal facilities and consequently are polluting streams in this area and are creating health hazards for themselves. Because of soil conditions many of the residents are unable to correct their failing septic tank systems. The soil in this area is a clay type which does not permit satisfactory percolation.

A survey of tests by the Indiana Stream Pollution Control Board on December 6, 1963, found that:

1. Raw and inadequately treated sewage is being discharged to Turkey Creek and its tributaries from sewers originating within the Conservancy District.
2. Low dissolved oxygen values and high coliform bacteria concentrations found downstream from the sewer outfalls within the Conservancy District indicate the streams are polluted and serious health hazards exist.

Twelve key points within the district were samples with the following coliform results:

3 points	40,000	to	430,000	Coliform mpn/100 ml
7 "	1,000,000	to	9,000,000	" " " "
2 "	24,000,000	to	46,000,000	" " " "

A sanitary sewer system is the most satisfactory answer to the abatement of the health hazards, stream pollution and contamination of ground water.

Adequate sewage disposal for the protection of public health is the most serious problem facing this metropolitan area. Health precedes all other needs such as transportation, schools and industrial activity. If the entire southern Lake County area is to continue development and growth, adequate sewers and sewage disposal are most necessary. This district serves as a hub or focal point for future expansion of Lake County. This district could serve as a model and guide to others, pointing the way to the solution of the sewage disposal problem, particularly for unincorporated areas. It could through its facility expand and provide sewage disposal service to the surrounding area.

The present construction will include approximately 154,850 feet of 8 to 30-inch diameter sanitary sewers, a sewage pumping station will discharge the sewage into the Gary Sanitary District Sewer System. The Gary Sanitary District will provide the treatment and final disposal of the sewage. Operation of sewer system is scheduled to start approximately July 1, 1966. The initial operation will have a flow of 500,000 gallons of sewage/day with an immediate growth load of the next 5 years expected at 2,000,000 gallons/day including expected services to adjacent areas now using small treatment plants. The pump station will be capable of handling 8,000,000 gallons per day to assure adequate capacity for this fast growing area.

In January, 1965, the Merrillville Conservancy District was notified by the United States Department of Health, Education, and Welfare of a $181,740 grant toward the construction of the pump station to handle sewage into Gary. No grant has been made for the 29 miles of interceptors covering the polluted area described above.

In conclusion, the Conservancy Act of Indiana has been established on this project as a means to provide a growing unincorporated community an economical and much needed centralized sewer service. Having been with this project since its formation, it can be said that the trials and tribulations are many especially in the financial area because of having to depend on the taxation support of low to average income families. Projects like this can easily fall by the wayside without the financial aid of the proper state and Federal agencies.

Thank you.

CHAIRMAN STEIN: Thank you, sir.

Are there any comments or questions?

Mr. Poole.

MR. POOLE: Next, I am going to call on Cities Service Oil Company, and I believe Joe Baum, who is their waste disposal coordinator, will speak for them.

MR. BAUM: Mr. Chairman, conferees, ladies and gentlemen --

CHAIRMAN STEIN: I wonder before you start, can Lou Berglar of Republic Steel come up.

MR. BAUM: I am Joseph S. Baum, coordinator of waste disposal for the Refining Division of Cities Service Oil Company.

My report to you today is to tell you of the progress made in pollution abatement at the Cities Service Oil Company's petroleum refinery located at 4900 Cline Avenue, East Chicago, Indiana.

This plant is a 55,000 barrel per day refinery processing sweet crude. It is a refinery employing only skimming and cracking operations. The manufacturing processes include crude distillation, delayed coking, fluid catalytic cracking, catalytic reforming and alkylation.

The water supply is obtained from Lake Michigan and is used on a once-through basis. Consumption, in 1964, varied from 60 million gallons per day (mgd) in the winter to a maximum of 95 million gallons per day in the summer. Approximately 96 percent of this water is used for cooling purposes only.

There are three separate sewer systems

within the refinery:

A. The sanitary sewer collects and discharges domestic wastes to the East Chicago Sanitary District.

B. The cooling water is collected in a separate sewer system and this water does not come in contact with petroleum products. To insure against accidents or breakdowns, such as tubular leaks, the cooling water sewer discharges through an oil-water separator to protect against the escape of any oil.

C. The third sewer system collects process water and discharges through an oil-water separator of American Petroleum Institute (API) Design.

The cooling water and process water join as the final effluent is discharged into the Grand Calumet River.

The East Chicago refinery was built in 1929. During the first 16 years of operation only one major change occurred and that was the addition of an Alkylation Unit for the manufacture of aviation gasoline. Strong sulfuric acid is used in the process; however, there is no pollution problem from this source as the spent acid is returned to the manufacturer by pipeline.

During the next 15-year period, from 1945 to 1960, many changes were made in processing units and waste treating facilities. In the early part of this period the plant completed a $20,000,000 modernization program. It was at this time that the company began its aggressive approach toward pollution abatement. Pollution control was a major factor in the design and selection of all new operating units. During this period the following improvements were made:

1. Built new oil-water separator of API design to improve oil and solids separation from process water.
2. Made process changes to eliminate acid treatment of certain petroleum distillates.
3. Built an internal water circulating system, at the new Delayed Coking Unit, to prevent coke fines and other contaminants from entering the sewer system. Coke fines are finely divided particles which are slow to settle and consequently were isolated from the sewer system.
4. Built treating unit to remove oily wax from water used at the delayed coking unit.
5. Additional sewers were installed for segregation of wastes and increased capacity.

6. Boiler water treating sludge was removed from the sewer and pumped to isolated ponds.
7. Also, many antipollution features were built into the new process units.

The cost of the water treating facilities, during this period, to improve the quality of the plant effluent, amounted to $1,203,000.

The foregoing has been presented to show early developments in pollution abatement and the company's interest in meeting its obligations. The next period I plan to cover is 1960 through 1964. I have limited this to a five-year period because this period is more closely related to the current problem, "the quality of Lake Michigan water."

In July 1960, modernization of the cooling water separator was completed. The separator was redesigned to meet present day practices for maximum separation of oil and solids which included an automatic cleaning mechanism for their removal. Also included in the design was the addition of an effluent weir with approximately a four foot waterfall. This waterfall permits aeration of the total plant effluent and increase the oxygen content by approximately 50 percent of the oxygen deficit. The cost of this improvement was $200,000.

January 1961, marked the beginning of operation of a newly installed spent caustic neutralizer. This eliminated the dumping of waste caustic to the sewer system. In this operation the waste caustic is neutralized with acid. After neutralization and settling, the acid oils or phenolic type compounds are separated and sold.

In the period of January 1961, to April 1964, a total of 1,883,000 gallons of waste caustic were collected and neutralized. The cost of this installation was $112,000. This operation was changed in April 1964, and will be covered later in this report.

In October 1961, a sour water stripper was installed to remove sulfides, ammonia and phenolics from the catalytic cracking unit accumulator waters. The stripper removes an average of 3700 pounds per day of sulfides for a 99.9 percent removal and 1500 pounds per day of ammonia for a 98.5 percent removal. The stripped water is then fed to a crude oil desalting unit where the phenolics are extracted by the crude oil. This total operation removes approximately 96 percent of the phenolics or 160 pounds per day. The cost of this installation was $96,000.

In November 1961, improvements were made on the delayed coker blowdown system to permit better separation of troublesome oily emulsions and retain these emulsions within the operating unit. These improvements cost $30,000.

In December 1962, an automatic cleaning mechanism was added to the secondary chambers of the API separator. Similar equipment had previously been installed in the inlet and primary chambers of the separator when it was originally built. In the secondary chambers the retention time and efficiency were gradually lowered as the solids would slowly build in the chambers. The addition of the cleaning mechanism is to keep the solids continuously removed and thus take advantage of the maximum settling time built into this unit and consequently attain maximum efficiency in oil and solids removal from the process water. This addition to the separator cost $31,000.

In April 1964, the plant began selling the spent caustic and consequently the caustic neutralization plant was shut down. By sale of the total quantity of waste caustic there was further improvement by eliminating all wastes from this operation. The amount of spent caustic collected and sold from April 1964, to the end of the year amounted to 956,000 gallons.

The plant policy has and will continue

to be, "attack the problem at the source and not allow wastes to enter the sewer system." This has been a very effective method to control the quality of the plant effluent and this policy applies to all operations within the plant. On occasions it is necessary to chemically clean certain operating equipment. This work is performed by outside contractors. The contracts covering this work stipulate that the cleaning wastes must be hauled away and not permitted to enter the sewer system. There are other wastes from in-plant operations that require special handling. An isolated spoils area has been provided for the disposal of such wastes.

Although great strides have been made in abating pollution, we do not want to leave the impression that our job is done. Pollution abatement is a problem requiring continual vigilance and we will continue to seek improvement. Future plans for improvements in 1965 include:

1. The condensed water from the delayed coker overhead product accumulator, though small in volume, contains sulfides and ammonia. This water will be sent to an existing sour water stripper for removal of the sulfides and ammonia.

After completion of this project the plant will be removing, from all process unit accumulator waters, 92 percent of the sulfides, 89 percent of the phenols and 91 percent of the ammonia.

2. A pH analyzer will be installed on the plant process water leaving the API oil-water separator. This will assist the plant in detecting any abnormal conditions occurring within the plant.

3. Installation of an automatic sampler on the plant final effluent water. In the past, the plant has relied on spot samples for the evaluation of the final effluent. It is our belief that a more accurate evaluation can be made on a 24-hour average sample.

4. We plan a pilot plant test run on a method to further remove minute traces of oil from plant process water.

Because of major improvements in the past, the Cities Service Refinery recognizes that they are entering into a period when additional attention is required and future improvements will be more difficult to achieve. To keep abreast of this problem the plant has reorganized and strengthened its waste disposal group. Recently a new man was added to spend full time on pollution abatement. It is his responsibility to coordinate all pollution abatement projects within the plant and serve as liaison on all related problems.

In conclusion, I should like to add that the Cities Service Oil Company has recognized its responsibility and obligation to improve the quality of the plant effluent water and this has been done. We have worked closely with the State of Indiana in making these improvements and this cooperation will continue in the future.

This concludes my report.

CHAIRMAN STEIN: Thank you, Mr. Baum.

Are there any comments or questions?

MR. KLASSEN: I have a couple, Mr. Chairman.

I noticed on the top of page 2, you say, "the cooling water and process water join as the final effluent is discharged into the Grand Calumet River."

According to some rapid calculations here, this is a dilution of about 18 to 1 to your waste load.

I am wondering, and I haven't had time to run through this, whether you plan to report your final effluent results and therefore your efficiencies and waste removal in parts per million?

If so, this tremendous dilution makes it look awfully good in parts per million. I would suggest, which I think I will do when the conferees meet, that it points up the importance of pounds of contaminant.

In other words, it masks it somewhat when there is this tremendous dilution and it is dilution with the same water that you are putting it back into.

The other point that I want to inquire about is -- I don't see anything in here about temperatures. Roughly 95 percent of your waste discharge is from the cooling processes. Do you want to make some comment on what is the temperature of your discharge?

MR. BAUM: I'd like to comment on both of your remarks.

The temperature -- I will take your last one first.

The temperature of our total effluent will run in the range of 90 degrees, possibly between 85 and 90 degrees.

Now, on the amount of water, it is my feeling that the thing that we are interested in is concentration in water.

When we go out to survey a stream, we talk concentration. We go to the Public Water Service Drinking Water Standards. They are all expressed in concentration. So if you have concentration in your effluent, that meets requirements. You are satisfying a need.

MR. KLASSEN: I wish I could agree with you, but I don't because on this basis, it might be cheaper and certainly give you a more effective picture by pumping more lake water into your effluent discharge.

CHAIRMAN STEIN: Right.

MR. KLASSEN: And this would make your effluent look good on concentration but it would not reduce the total amount that you are putting into the outlet stream.

MR. BAUM: Well, I thought I had certainly shown in my report that the thing that I had done to remove products from our waste, is to help the situation that you are talking about.

CHAIRMAN STEIN: No, I think, as I understand Mr. Klassen's question, in my mind, he makes a point. He is talking in terms of cooling water.

Let's forget the cooling water for a minute. If your theory is correct and you have an effluent, you don't have to have any cooling water. All you have to do is draw up some clean water from your source, mix it with the effluent, reduce your concentration and say you've got it made.

MR. BAUM: Well, I don't think that that is quite what I am saying.

CHAIRMAN STEIN: Well, I think this is the point that Mr. Klassen raised. I just wanted to clarify this.

MR. KLASSEN: I want to emphasize this: My question has nothing to do with the excellent progress and the real job you have done. I am merely raising this not for you, but for the rest of the industries; because, more and more, I would say the control agencies are interested in the total pounds or amounts, rather than the concentrations because this doesn't give a true picture.

MR. BAUM: Well, that is the point that I am trying to make; that I -- let me give you a ridiculous idea in trying to bring out my point.

Here we have Lake Michigan, and I believe it is about 22,400 square miles. If you assume an average depth of 50 feet and then calculate this out on a one part per million BOD, you will come out with a population equivalent for Lake Michigan of something in the order of 11 billion people.

Well, it doesn't mean anything. Now, if the concentration is satisfactory, one part per million which I think was in Mr. Gerstein's report, that if he had water that is one or one-half part per million at the crib inlet, that he was in very good condition. So it seems to me that concentration is all important in that you can't -- I am not saying that you can't use pounds per day in certain cases, but I do think that pounds per day cannot be a guiding factor in all situations.

CHAIRMAN STEIN: I have two points here: one, as I see this and as I have listened to this, we don't get this wonderful average in disbursing everything entirely through Lake Michigan.

I think as the Department of Health, Education, and Welfare report indicated along with the Chicago experience -- Hy Gerstein indicated -- this pollution goes in slugs in the waves and in groups through the lake.

The other point that I get -- and I again am looking for something here --- if we divorce ourselves completely from Mr. Klassen's concept, the only thing you have to do in order to meet a concentration concept is to get in enough water from your water supply and dilute your waste and then put it out. If all we are doing is measuring the concentration and just getting enough dilution, you have the concentration without providing any kind of treatment facility.

I am not saying that you are doing this, and I want to make this clear. I think the Cities Service Plant has, it seems to me, a very good program and has a real enviable record of waste disposal.

It is only when you get to the good ones that you can ferret out these fine points. I do think Mr. Klassen has a real philosophic point here. Because if you can get waste and if before you discharge it, you can put that in with some fresh water source, you can adjust that concentration to suit yourself.

MR. BAUM: Well, it sounds easy, but that is not cheap. You don't pump that water for nothing.

(Laughter.)

CHAIRMAN STEIN: You might not. It might be a little easier pumping it and diluting it than treating it. Because if it weren't cheaper, I can see why some people say "dilution is the solution to pollution" and want to use the public water supply to provide that dilution.

If it weren't cheap, they wouldn't go to too much trouble pumping it out.

MR. KLASSEN: I think basically we are talking about whether or not we subscribe to the concept of using a fresh water resource in lieu of treatment. I think this is what we are talking about, and, again, I want to emphasize you just happened to be the first one up here that we could ask, and it certainly is no reflection on the excellent job your refinery has done, believe me.

CHAIRMAN STEIN: Are there any further questions?

MR. POSTON: Is it my turn?

CHAIRMAN STEIN: By the way, I'd like to emphasize again that I do think that the record of your company is indeed enviable. This is pretty good.

MR. BAUM: Thank you very much, Mr. Chairman.

MR. POSTON: I notice that on page 5 you have eliminated all of the waste from the operation. The amount of spent caustic has been corrected and sold from April of '64 to the end of the year amounted to 956,000 gallons, and I noted that you had made the point of the cost of your treatment previously.

Would you care to give how much savings was made by way of selling this material?

MR. BAUM: Well, we didn't save in either case; it cost us money.

MR. POSTON: To sell?

MR. BAUM: Yes, both. It cost us to neutralize, in even -- we operated at a loss to dispose of the phenolics which we did receive a price for.

We do receive and save a little bit by

selling the total caustic, the waste caustic, but to us, getting rid of a product completely and not having the operation within our plant is worth the extra expenditure.

MR. POSTON: One other question: Does Cities Service have any objection to giving the operation effluent data, data of the amounts of specific chemicals discharged to the watercourse?

MR. BAUM: I don't have -- I didn't bring any data of hours along with me. The only data that I have looked at was the data you have taken on your 24-hour composite sample, and I did write down the comparison of our effluent with the stream that we were going into.

Just as a comparison, because they were both 24-hour samples taken at the same time, if you care to, I would review those. There is only about five of them. It will be very short.

MR. POSTON: Okay, I'd be glad to hear that.

MR. BAUM: These samples were taken by the Great Lakes-Illinois River Basin Project when they were working in our area.

The samples were taken on October 24, 1963. They sampled our effluent and then, at the same time, they sampled the Calumet, Grand Calumet River, but it is 100 yards downstream of where our effluent enters, so our effluent does influence the downstream sample to some extent, because we don't know how much mixing you get from our effluent in a hundred yards.

However, the data taken was the Grand Calumet River. On ammonia, it contained 5.1 parts per million.

The Cities Service effluent contained 1.7 parts per million or only about a third as much.

On BOD, the Grand Calumet River contained 9.5 parts per million; and the Cities Service effluent contained 4.8, or only half as much.

The dissolved oxygen in the river was 2.1 parts per million; the dissolved oxygen on the Cities Service effluent was twice as high. It was 3.9 parts per million which makes the dissolved oxygen a higher content, better for our effluent.

Oil in the Grand Calumet River was 12 parts per million. On the East Chicago effluent, it is 6 parts per million or half as much.

Phenolics, it was 305 parts per million in the Grand Calumet, this is 191 parts per million in the Cities Service effluent.

I think this illustrates the effectiveness of our method of trying to treat these wastes and get these down lower and meet our obligation of trying to upgrade our effluent.

MR. POSTON: I think that is all.

CHAIRMAN STEIN: Well, thank you very much, Mr. Baum.

(Applause)

MR. POOLE: Next on the list is the duPont Company and I guess Mr. J. M. Devins, Plant Manager, is going to represent duPont.

MR. DEVINS: Chairman Stein, conferees, ladies and gentlemen, my name is John M. Devins. I am manager of the duPont Company Plant in East Chicago, Indiana.

The plant is located on the north shore of the Grand Calumet River between Kennedy and Cline Avenues.

The plant began chemical manufacture in 1893 and has been in continuous operation for the past 72 years. We currently employ 440 people. The principal products are inorganic chemicals: sulfuric acid, hydrochloric acid, sulfamic acid, silicates, and chlorides of zinc and ammonia. Fluorocarbon products and small volumes of organic herbicides are also produced.

Our current wastes entering the Calumet River contain very little organic matter; they are largely inorganic in nature. From our studies we conclude that these wastes have no material effect on the water quality of the river. Sanitary sewage is pumped to the East Chicago Sanitary District Treatment Plant.

DuPont regards pollution abatement as an essential part of every process. Technical studies on pollution control are conducted simultaneously with the research and development of every new product. The design of a manufacturing unit always includes provision for pollution control.

Facilities for preventing losses or recovering valuable products are an important factor in remaining competitive. Whenever possible, we treat our waste streams for recovery of valuable products. In addition, we have made a determined effort to abate any remaining pollution. Following are some examples:

In 1954, we installed equipment to neutralize diluted acid contained in a salt solution from our silicate operation. The solubility characteristics of this solution required a detailed technical study to design equipment that would perform reliably. These facilities are operating satisfactorily.

In 1955, when design of a new sulfamic acid plan was undertaken, our plans were discussed with the Indiana Stream Pollution Control Board before construction began. Our waste discharge program was approved, and a permit for this operation was issued. The permit requires monitoring of the discharge stream and a report is made regularly to the Indiana Stream Pollution Control Board.

A very recent addition to pollution abatement facilities is in conjunction with the manufacture of organic herbicides. Early in our planning of this new product line, we approached the Pollution Control Board and developed a waste disposal program involving rigid controls. A permit was issued and performance reports are submitted to the Board regularly.

Now I would like to discuss the matter of controls:

We continuously sample our main process effluent, chemically analyzing the samples for traces of products. Not only does this guard against pollution of the Grand Calumet River, but it provides us with a means of detecting operating irregularities and thus enables us to make corrections promptly.

On two occasions, in 1960 and in 1962, we studied the water quality of the Grand Calumet River in the vicinity of our plant. The studies were carried out by engineers under the direction of a pollution abatement specialist. Intensive study was made from a point one half mile upstream of the plant to the Indiana Harbor Canal -- about one mile downstream.

In these studies hundreds of samples were collected for chemical analysis. We also checked our plant outfalls by measuring flow rates and chemical composition, and compared this total with the changes in concentration of each constituent in the river between upstream and downstream sampling stations.

In general, the two methods of measurement were in agreement and satisfied us that the monitoring program was accurately controlling the waste load from the plant.

Two areas where supplemental control might be beneficial were disclosed by these studies, specifically in sulfur dioxide and zinc wastes. Engineers were assigned to study recovery methods for both of these materials. After considerable technical effort, we developed means of recovering these materials. Construction of facilities has been underway during the past year and will be in operation very shortly. When this new equipment is operating, we plan to make another survey of the river as a part of our continuing pollution control program.

Now, in summary, the duPont Company has taken a positive approach to preventing pollution of the

Grand Calumet River. We have cooperated fully with the Indiana Stream Pollution Control Board in the design and construction of pollution abatement equipment. The performance and maintenance of this equipment is regularly monitored. Surveys of the river substantiate that we have an effective control program.

Thank you.

CHAIRMAN STEIN: Thank you, sir.

Are there any comments or questions of Mr. Devins?

MR. CHESROW: To what extent are you now dumping chlorides into the river?

MR. DEVINS: I read a report in the Hammond Times that we were dumping 90,000 pounds of hydrochloric acid in the river. This is not true.

MR. CHESROW: How much are you dumping?

MR. DEVINS: We are dumping none.

MR. CHESROW: None at all?

MR. DEVINS: None at all, and we have worked with the Indiana Pollution Control Board and obtained a permit which has been discussed earlier in this conference to dump the acid, that one of the provisos was that we would try to sell the acid and I can report that we are selling the acid.

MR. CHESROW: Are you recovering all your acid?

MR. DEVINS: Pardon?

MR. CHESROW: Are you recovering all your acids?

MR. DEVINS: Well, we make and sell acid and the only acid loss that we have would -- I would define it as a yield loss, so we do have some.

MR. CHESROW: To what extent? How much was -- what is the percentage of loss?

MR. DEVINS: Pardon?

MR. CHESROW: The percentage lost.

MR. DEVINS: I don't have the exact figure, but it is very low. I could get that information.

MR. CHESROW: Does the Indiana Board control the loss, keep tab on your loss?

MR. DEVINS: Yes, we make reports to the Indiana Pollution Control Board on our losses.

MR. CHESROW: Thank you.

MR. POSTON: We had pictures of duPont shown on Tuesday by Mr. Le Bosquet--of the duPont Company with a whitish appearing waste going to the Grand Calumet River, and I wondered whether you saw that slide or whether ---

MR. DEVINS: I did not, Mr. Poston.

MR. POSTON: Well, I'd like to show this slide and see if you could identify what this material might be.

I see from some of our results, there are some 40,000 pounds daily solids going to the river, and I wondered if this were part of it and what this might be.

MR. DEVINS: I believe that is the picture that is in the back of the room, is it not?

MR. POSTON: Yes.

MR. DEVINS: That is the slide of the picture in the back.

Well, I have a summary of our various wastes here going to the river, and I would say that that is probably a sulfate salt, some sulfate, calcium sulfate, perhaps.

MR. CHESROW: And referring to the slide, the percentage of wastes that are disposed of in the river, are they controlled at their source?

MR. DEVINS: Pardon, sir?

MR. CHESROW: Do you measure them? Your controlling factor is -- is it at the source that it goes into the river?

MR. DEVINS: Yes, we control at the source and we also check the outfalls.

MR. CHESROW. You do check the outfalls?

MR. DEVINS: Yes.

MR. CHESROW: Do you have the figures available as to the percentages at the outfall and at the source, please?

MR. DEVINS: I could make these available. I think I'd have to do a lot of calculating to convert them into pounds per day or parts per million.

MR. CHESROW: Roughly, roughly, would you venture a guess?

MR. DEVINS: Pardon, sir?

MR. CHESROW: Would you venture a guess?

MR. DEVINS: A guess on what, now?

MR. CHESROW: On the percentages.

MR. DEVINS: Well, the increase in the concentration of constituents in the river is the result of discharge from the duPont plant --

MR. CHESROW: From the duPont plant only.

MR. DEVINS: -- is in terms of a few parts per million.

Now, I am not --

MR. CHESROW: Is it as low as that?

MR. DEVINS: Yes, it is low.

MR. CHESROW: All right, thank you.

CHAIRMAN STEIN: Do you have any further questions or comments?

MR. POSTON: No, I think that is it.

CHAIRMAN STEIN: Thank you very much, Mr. Devins.

Mr. Poole.

MR. POOLE: Next, we have Mr. A. J. Shulter of

U.S.S. Lead Refinery, and I don't know whether Mr. A. J. Shuler or Mr. Warner is going to represent them.

MR. SHULER: Mr. Chairman, conferees, ladies and gentlemen, I am A. J. Shuler, not Shulter, Plant Engineer of U.S.S. Lead Refinery in East Chicago.

MR. POOLE: I beg your pardon.

MR. SCHULER: This plant is located on about the 79 acres of land on the north bank of the Calumet River immediately west of Kennedy Avenue.

Approximately 10 acres of this 79 acres is improved with roadways, railroad tracks, buildings and production facilities. None of the area within 300 yards of the north water edge of the Grand Calumet River is improved.

The total employment of this plant is small, normally about 120 employees.

This plant has been engaged in the refining of nonferrous metals since 1906.

The U.S.S. Lead Refinery, Inc., is using water from the Grand Calumet River for cooling metal moulds and for circulating in water jackets. This water is then returned to the river. The water from this river is also used for our fire hydrant system.

We are concerned that the river water be of good quality.

The average amount of water obtained for these purposes from the Grand Calumet River is less than 1/4 million gallons per day and, as mentioned above, this small amount of water is returned to the river.

We know of no way in which nitrogen, phosphorus or cyanide compounds, bacteriological pollutants, oil, acidic or alkaline materials or trash are discharged to the Grand Calumet River from our plant.

Conforming to the wishes of the various interested agencies, this plant constructed a separate sanitary sewer system in 1947 at a cost of $26,585.00. All domestic wastes pass through this system to the East Chicago Sanitary District sewage treatment plant. There are no combined storm and domestic sewerage systems in this plant.

We appreciate the opportunity of presenting this information to the committee.

CHAIRMAN STEIN: Thank you, Mr. Schuler. Are there any comments or questions?

MR. KLASSEN: You have no industrial wastes, then; only domestic wastes?

MR. SCHULER: We have a small amount of what might be called industrial waste which goes to the East Chicago

Sanitary District.

CHAIRMAN STEIN: Are there any comments or questions?

If not, thank you very much, Mr. Schuler.

MR. POOLE: Thank you, Mr. Schuler.

Next is General American Transportation, Dr. Gregoire Gutzeit, Senior Scientific Advisor, who will handle their presentation.

DR. GUTZEIT: Mr. Chairman, conferees, ladies and gentlemen, I am not going to mention the sanitary wastes which are connected to the East Chicago treatment plant.

Plant No. 2 of General American Transportation Corporation is located on Railroad Avenue in East Chicago, Indiana. Its function is to maintain and repair units of the large tank- car fleet, owned and leased by the Corporation, as well as contract maintenance of conveyances previously manufactured for and sold to customers.

Cleaning of these tanks may be required for various reasons, but mainly in order to perform needed repairs, or to start shipment of a different product which frequently is the result of a seasonal change.

The method of tank- car cleaning depends obviously on the last commodity carried. However, the liquid wastes which contribute to stream pollution are generally produced by draining, steaming, and/or rinsing.

Steaming can be carried out with or without the introduction of additional detergents or solvents. In the former case, a so-called "syphon" is used; that is, a T-shaped attachment which serves the purpose of dispersing water, a detergent solution, kerosene, or caustic soda solution into the steam jet. Kerosene is used to facilitate the removal of heavy petroleum products. Caustic soda solution is injected to saponify vegetable oils, animal greases and similar glycerides. Wet steam is applied to acid and alkali-tanks. Detergent solutions are helpful with materials such as rosin, tar oils, etc.

Liquids resulting from simple drainage mixed with the wash waters and steam condensate, represent the fluid waste of these maintenance plants.

Slide one, please:

This slide shows the steam on both sides. There are tank-cars in the center and the drainage flume. All right.

Due to the large number of products shipped in bulk and to traffic fluctuations, this waste is extremely complex and variable. However, its daily volume, and therefore its contribution to the total pollution load of Lake Michigan Basin, is quite small.

The maintenance shop in East Chicago has been in operation since 1937. Until 1948, the waste was discharged into a large settling pond, about one acre area by an average 8 feet deep, and the overflow of the latter was received by the Indiana Harbor Canal. In late 1948, at the request of the Indiana Stream Pollution Control Board, studies were initiated with the purpose of designing a treatment system. However, the problem was further complicated by three factors which are only encountered in old, established car maintenance plants:

1. The cleaning tracks and receiving flumes had been built more than ten years previously, and were unsuitable for segregating the cars into separate classes, according to the commodity last carried, which is a practice we apply in new plants.
2. The space available for the treatment system was minimal, and thus dictated the choice of methods requiring compact equipment.
3. The East Chicago Municipal Sewage Works have constantly refused to accept any type of industrial waste for secondary treatment,

regardless of the degree of pretreatment, and I have been happy to hear today that this policy may have changed.

(Laughter.)

Under these circumstances, it was obvious that only a compromise solution could be reached.

A survey of the waste's character and volume was carried out from November 1, 1948, to April 30, 1949, in East Chicago as well as in another of the Corporation's maintenance shops in Masury, Ohio.

In East Chicago, a grand total of 1,611 cars, distributed as follows, were cleaned during the six months' period.

23.66 percent of these cars had been used to ship solid commodities which do not contribute to water pollution.

The remainder had been last loaded with various commodities which I tabulated.

44 percent of them being petroleum products, oils, fats, et cetera; others being acids, alkalies, organic chemicals and so forth.

Another 18-day survey in September, 1948, of cars loaded with liquid commodities indicated an even broader observation. The tabulation is attached to our statement. That is Table II.

A recent 5-day sample collection was made from February 9th to February 15, 1965. During that period, a total of 65 cars were cleaned. However, eight tank-cars contained solid materials and five held products volatile at steam temperature so that only 52, or an average of slightly over 10 tanks per day contributed to the production of liquid wastes, mineral, vegetable and animal oils and/or greases represented again the most frequent loadings, 30 cars or about 58 percent. (Cf. Table III)

For the purpose of estimating the volume of the liquid wastes, based on an eight-hour operation for 25 days per month, water and steam consumption were checked twice over 60-day periods in the Corporation's Masury, Ohio, maintenance plant. It was found that a maximum of 312.5 gallons of water including steam condensate was used per car hour or 2,500 gallons per car per eight hour day. However, all the positions on the cleaning tracks are practically never occupied in any single day and only about 50 percent of the rack's capacity is used over a long period.

In East Chicago Plant No. 2, the expected total cleaning load, including cars having last shipped solids or gases, has been and still remains an average of 15 cars per eight-hour day. This represents a maximum of 37 cars and 500 gallons per day.

The treatment system was therefore planned for a maximum volume of 50,000 gallons per day of liquid wastes. This figure, as printed, was more than twice the capacity actually required.

This is shown by the flows measured when the plant was in normal operation.

For instance, during the year 1959, a total of 5,784,750 gallons of waste was treated, representing 19,282.50 gallons per working day at 300 days per year or 15,848.63 gallons for a 365-day year.

The maximum occurred in March with an average volume of 20,175 gallons per day. During the six-month survey period, weekly composite samples were collected and analyzed. Because of the particular nature of the waste, no BOD determinations were made. Instead, chemical oxygen consumed was measured after sludge settling and gravity separation of free oil.

The following data indicate the character of the raw waste. The results are in parts per million.

Raw waste, this is a C.O.D. figure, the first figure, acid chromate, silver catalyzed, 3,000 to 6,000; after sludge settling and oil separation, 256 to 1,340.

Ether extract, 594 to 1,771; after sludge settling and oil separation, 20 to 160. Phenols, 8 to 32; and after sludge settling and oil separation, 8 to 24.

Suspended solids, 2,600 to 3,100; after settling, 600 to 1,700.

Laboratory testing of possible treatment methods, adaptable to the existing conditions, showed that chemical precipitation or coagulation followed by clarification, would reduce the oxygen consumed to about 30 to 150 ppm; the ether extractables to 5-15 ppm; and the suspended solids to 20 ppm or less.

However, phenols or other stable aromatics were not affected. Experiments with chemical oxidation of phenols, using chlorine dioxide, indicated possibility of achieving reduction from about 20 to 2 ppm, although reagent consumption appeared very high.

On the basis of these investigations, a treatment system was designed in 1949 and built in 1950 with a theoretical capacity of 50,000 gallons per day.

The original plant incorporated chemical oxidation of phenols, a solution of chlorine, dissolved oxygen controlled by a recently developed phenol-monitoring device was fed into the final outlet line.

In 1952, the Board of Sanitary Commissioners, City of East Gary, was again requested by General American Transportation Corporation to allow the pretreated waste to be fed into the city sewers. On the basis of previous policy decisions, this proposition was rejected by letter dated June 10, 1952, stating that only domestic sewage would be accepted.

Consequently, the treated waste had to be discharged into the Indiana Harbor Canal.

Unfortunately, due to the complex nature of the waste, chlorine dioxide consumption proved totally inconsistent and always excessively high.

It had, therefore, to be discontinued both for economic and technical reasons. Further, operating experience indicated the need for modification of the system.

The present flow-diagram can be summarized as follows: Slide 2.

The raw waste from tank-car cleaning operations flows directly into the large settling pond over one acre by an average of eight feet deep.

Through a submerged pipe, surrounded by a cylindrical baffle retaining the supernatant oil, the waste is pumped into two open oil separators of standard construction, connected in series; then, into three associated holding and equalizing tanks of 10,000 gallons capacity each, steam heated.

From there, it flows into the large pre-settling tank where it is neutralized by a large lime slurry or by sulfuric acid, as the case may be.

The waste can be alkaline or acid.

The total aluminum sulfates required for flocculation and absorbed is indicated by preliminary laboratory tests and is also fed into the pre-settling tank and returned to the pond.

The overflow is pumped at the rate of 75 to 80 gallons per minute into an eleven-foot diameter clarifier where the remainder of the aluminum sulfate, as well as some additional lime, are fed within a controlled pH range, between 6.5 and 8.

The clear effluent is discharged into the Indiana Harbor Canal, while the sludge is returned to the pond. The latter is cleaned each winter by an outside contracting firm and the accumulated sludge is hauled away.

Slide 3, please.

This shows the pre-settling basin, and in the back the accelerator, the control building.

Slide 4: This shows the interior of the control building with the controller, phenol controller and pH. There is still the chlorine dioxide equipment.

During the initial operation of this system, two composite samples of the effluent collected at different periods gave the following analyses.

O.C., chemical oxygen consumed, 182.4; ether extract, 45.0; phenols, 21.8; suspended solids, 12. This is a high sample.

A low sample: chemical oxygen consumed, 30.0; ether extract, 6.8; phenols, 23.2; suspended solids, 0.01.

As can be seen, the operational results of the waste treatment system confirm reasonably well the findings of previous laboratory work.

Slide 5, please.

That shows the waste, the raw wastes on the left side and on the right side the chloride overflow.

A composite sample of raw waste from the pond collected recently over a 5-day period from February 9, to February 15, 1965, was analyzed for a number of pollutants, some of which have not been formerly reported.

The concentration of these components was also determined in the treated effluent. As could have been expected, phosphorus is substantially removed as an insoluble precipitate.

(Text Continued on Page 993)

TABLE CI

	INSOLUBLES			ACIDS		SOLUBLES			
DATE	PETROLEUM-PROD.	CHEMICALS	FATS, ETC.	ORG.	INORG.	ALKALIES	ORG. CHEMICALS	OTHER	PHENOLS
9/24	2	2				1	2	1	
9/25	1			2		1			
9/26	1	1				1	1		
9/27						1			
9/29						2	1	1	
9/30								1	
10/3			2	1					
10/4						2			3
10/6				1				2	1
10/7				1	1			1	
10/8				1		1		2	1
10/10				1				1	1
10/13	2								1
10/14								3	
10/15	1							1	
10/16								2	
10/21				1		1		1	
10/22				1	4	1			
	7	3	2	9	5	11	4	16	7

TABLE III

Date	(Last Load) Commodity	Remarks
2-9-65	Syrup	
	Crude Soya Bean Oil	
	Steep Water	
	Reclean	Water Wash
	Reclean	Water Wash
	Reclean	Water Wash
	Reclean	Water Wash
	Caustic Soda	
	Ined. Tallow	
	Sulfuric Acid	
	Ref. Vegetable Oil	
	Ined. Tallow	
	#2 Fuel Oil	
2-10-65	Diesel Fuel	
	Sulfuric Acid	
	Crude Soya Bean Oil	
	Light Residual Fuel	
	Neats' Foot Oil	
	Methanol	
	Black Strap Molasses	
	Tar	Solid
	Tar	Solid
	Lube Oil	
	Crude Soya Bean Oil	
	Lube Oil	
	Lube Oil	
	Diesel Fuel	
	Sulfur	Solid
	Plastic Roofing Cement	Solid
2-11-65	Crude Vegetable Oil	
	Ined. Grease	
	Chemical (?)	
	Naphtha	Volatile
	Lard	
	Pet. Naphtha	Volatile
	Fuel Oil (Heavy)	
	Diesel Fuel	
	Carbon Bisulphide	Volatile
	Sulfur	Solid
	Tar	Solid
	Plastic Roofing Cement	Solid

TABLE III
(Continued)

Date	(Last Load) Commodity	Remarks
2-12-65	Lube Oil	
	Lube Oil	
	Crude Vegetable Oil	
	W/W Pet. Oil	
	Phosphorus Trichloride	
	Phosphorus Trichloride	
	Phosphorus Trichloride	
	Phosphorus Trichloride	
	Fuel Oil	
	Carbon Bisulphide	Volatile
	Molten Sulfur	Solid
2-15-65	Fatty Acid	
	White Oil	
	Molasses	
	Ined. Grease	
	Triethanolamine	
	Synthetic Resin	
	Fuel Oil	
	Naphthalene	
	Ammonia	Volatile
	Sulfuric Acid	
	Ined. Grease	
	Ined. Tallow	
	Diesel Fuel	

* C.O.D. of Composite for 5 Days* - 3300

* Silver Catalyzed Chromic Acid Method (8)

GENERAL AMERICAN TRANSPORTATION CORPORATION
(Dr. Gregoire Gutzeit)

TABLE III
(Continued)

SUMMARY

(Feb. 9 - Feb. 15, 1965)

C.O.D. of 5-Day Composite Sample: 3300

Liquid & Soluble Commodities	Number of Cars	Liquid & Soluble Commodities	Number of Cars
Lube Oil	7	Sugar Syrup	1
Inedible Animal Grease	6	Steep Water	1
Crude Vegetable Oil	5	Caustic Soda	1
Refined Vegetable Oil	1	Sulfuric Acid	3
Diesel Fuel	4	Methanol	1
Fuel Oil	5	Black Strap Molasses	1
Neats' Foot Oil	1	Phosphorus Trichloride	4
Fatty Acid	1	Triethanolamine	1
		Synthetic Resin	1

City of East Chicago, Indiana

DEPARTMENT OF PUBLIC SANITATION

152nd and Indianapolis Blvd.
East Chicago, Indiana

June 10, 1952

General American Tank Car Corp.
4405 Euclid Avenue
East Chicago, Indiana

Attention: Dr. G. Gutzeit

Gentlemen:

We have given careful consideration to your company's request for permission to make connection with and thereby to discharge certain industrial wastes into the sewerage system of the City of East Chicago, which wastes must eventually pass thru and be treated by this plant.

In accord with past policy, the Board of Sanitary Commissioners shall accept for treatment at the East Chicago Sewage Disposal Plant any and all sanitary wastes. The Board, likewise in accord with past policy, feels that industrial wastes, treated or untreated, do not constitute a sanitary waste and as such must be eliminated from the city sewerage system.

Knowing that you understand the past policy of this Board and that you fully appreciate the Board's position in this matter we remain,

Very truly yours,

BOARD OF SANITARY COMMISSIONERS

By Charles Sandor (signed)
President

C O P Y

Cyanide and heavy metals were absent. Phenols were low in ppm. Total nitrogen was reduced from 830 ppm to 570 ppm and tar residue from 15 ppm to zero.

Future plans involve a systematic settling program and a more complete analytical evaluation.

Summarizing, it can be stated that the waste from GATC Plant No. 2, while very complex and of variable character, represents only a small volume, mainly 0.02 MGD, and after treatment, contributes minimal quantities of pollutants to the Lake Michigan Basin.

CHAIRMAN STEIN: Thank you, Dr. Gutzeit.

Are there any comments or questions?

MR. POSTON: I'd like to ask the Doctor how the disposal of solid wastes is accomplished; that is, the settled material?

DR. GUTZEIT: Settled material is hauled away by a contractor once every winter when those tars are pretty solid.

MR. POSTON: You don't know the ultimate disposal point?

DR. GUTZEIT: I don't know, and I don't think any of our plant people know. We just contract for this.

MR. POSTON: They are hauled away, though?

DR. GUTZEIT: They are hauled away.

MR. POSTON: Thank you.

CHAIRMAN STEIN: Thank you.

(Applause.)

Mr. Poole.

MR. POOLE: Next, we have the Blaw-Knox Company, to be represented by Mr. R. J. Mauthe, Chief Plant Engineer.

MR. MAUTHE: Mr. Chairman, distinguished conferees, ladies and gentlemen, the East Chicago Works of Blaw-Knox Company is located at 4407 Railroad Avenue in East Chicago, next to General American Plant No. 2. It is on the east side of the Indiana Harbor Canal between Columbus Drive and Chicago Avenue.

Operations include steel melting, iron melting, foundry and machining.

Normal employment is about 2,000, with about 50 percent working the day turn, 30 percent the afternoon turn and 20 percent working the night turn. Operations are normally reduced to about 30 percent on Saturdays and a standby crew on Sunday.

All water is purchased from the City of East Chicago. Service water systems are largely closed loops, with make-up water coming from the City and overflow going to the storm sewer. All storm sewer systems empty into the Indiana Harbor Canal. Sanitary sewer systems are connected to the City's sanitary sewer.

About 1960, Blaw-Knox started a modernization and relocation program at East Chicago. Special efforts have been made to connect sanitary units to the sanitary sewer and stormwater lines to the storm sewer.

A wet sand reclamation unit was installed about five years ago in our No. 1 Foundry. A settling tank and filter were provided to remove suspended solids from the water. The clarified water is then reused in the reclaimer, creating a closed system. The water from a wet dust collector also goes to this settling tank and filter. This system is under continuous study to determine whether any of the fines are bypassing the settling tank or filter and reaching the storm sewer.

A number of wet dust collectors in our No. 2 Foundry rely on a pair of settling tanks for collecting suspended solids. Funds have been provided to replace about 60 percent of this dust collecting capacity with dry type units. The resultant lighter load on the settling tank is expected to increase its efficiency. The efficiency of the third wet dust collector settling tank is currently being evaluated.

A large roll grinder has been relocated and provided with cascade settling tanks to remove grinding sludge from the coolant. The coolant is recirculated from the last tank back to the grinder, creating a closed loop. We plan to relocate the two remaining grinders and provide more efficient coolant clarification facilities for them.

In conclusion, we plan to continue our efforts to confirm specific flow connections, diverting the flow to the sanitary sewer where indicated. As indicated above, we are checking our clarification equipment and are attempting to improve its efficiency.

CHAIRMAN STEIN: Thank you, sir.

Are there any comments or questions?

MR. POSTON: I note that you have some 2,000 employees. I wondered what happens to the sanitary wastes or sewage from your plant.

MR. MAUTHE: I mentioned earlier in the talk here that all of it goes to the City's Sanitary Sewer.

MR. POSTON: I see. I didn't catch that. Thank you.

CHAIRMAN STEIN: Thank you very much, sir.

Mr. Poole.

MR. POOLE: I have a letter here from American Steel Foundries, Transportation Equipment Division, signed by Mr. Alex Morris, Works Engineer for the American Steel Foundries, and I am quite relieved that it is very brief.

It is addressed to me and I will read it and furnish it for the record here.

"Mr. B. A. Poole, State of Indiana Stream Pollution Control Board, 1330 West Michigan Street, Indianapolis, Indiana, 46207.

"Dear Sir:

"Letter of January 29, 1965 request for information on water pollution abatement. American Steel Foundries Incorporated, Indiana.

"All sanitary sewers are connected to the East Chicago Sanitary District.

"Process water is used primarily for quenching and cooling. A survey was conducted by the Industrial Waste Section, Division of Sanitary Engineering, State Board of Health, State of Indiana in the summer of 1962. A copy of this report is attached. An analysis of this report shows that of the 93,000 gallon per day flow, 482 ppm solids were measured. .7 ppm is given as iron. We attribute the balance to be zirconium oxide sand which is an inert material used in our plant.

"We are interested in any supplementary information which you might have concerning our plant and would appreciate receiving such information.

"Yours very truly, R. L. Jones, Works Manager, by Alex Morris, Works Engineer."

I shall be glad to answer all or any questions, Mr. Chairman.

CHAIRMAN STEIN: I wouldn't underestimate you.

MR. POOLE: Thank you.

CHAIRMAN STEIN: Do you want to call your next participant, Mr. Poole?

MR. POOLE: The next one is Linde Division, Union Carbide, Mr. R. L. Shaner, Regional Engineer.

MR. SHANER: Mr. Chairman, official conferees, ladies and gentlemen, I am R. L. Shaner and represent the Linde Division of Union Carbide Corporation in the capacity of Regional Engineer.

We operate an air separation facility at 4400 Kennedy Avenue in East Chicago, Indiana. Our west property line is adjacent to the Indiana Harbor Canal. The Indiana Stream Pollution Control Board has designated Linde as a participant in this conference.

Our principal operation is the production of oxygen, nitrogen and argon. These are separated from the air by means of a low temperature process. We also operate a steam-electric power station for supplying a part of the total power requirements of our facility. Our gaseous products are distributed to our customers by means of pipelines. Our liquid products are shipped by special tank cars, tank trucks and semi-trailers to most distant points.

Water is used in our process primarily as a cooling medium. The water we use is purchased from the City of East Chicago. It is supplied to the plant at rates of about 1 to 1.6 million gallons per day. Water is recirculated through compressor collars, condensers and cooling towers. Some water evaporates in the cooling tower. This must be replaced with fresh water. This process increases the concentration of materials already present in the water. In order to minimize the results of this concentrating effect, the usual water treatment chemicals are added to the recirculating water. Also a certain portion, generally about one-quarter of the make-up, is discarded to prevent further buildup of minerals.

A separate sanitary sewage system is employed at our facility. This system is tied in to the sanitary sewers of the City of East Chicago. Thus no sanitary sewage is discharged by Linde into the Indiana Harbor Canal.

Linde discharges cooling water into the Indiana Harbor Canal as reported in Table VI-3b of the Blue Report. We have been using an independent laboratory to study the problem of waste fluids disposal. Our approach to the Stream pollution problem has been one of contaminant elimination rather than treatment, believing that this is a more satisfactory solution.

Recent actions to eliminate stream pollution include a permanent blocking of a drain line from the ash-water pits of the power station, the blocking of drains from the air compressor blowdowns and the installation of a sump and pump to divert these streams to a settling basin.

Plans are in progress to connect the overflow and blowdown lines from the cooling towers to an enlarged settling basin. When this is completed our outfall to the Indiana Harbor Canal will be handling nothing but rain water from our roof drains.

We will keep the Indiana Stream Pollution Control Board apprised of our progress. All data pertaining to this study will be available to that Board.

Although our contribution to the problem of stream pollution is relatively minor, money has been spent and we plan to spend additional money and effort toward the elimination of stream pollution.

Thank you.

CHAIRMAN STEIN: Thank you, Mr. Shaner.

Any comments or questions?

When you say "recent actions," what do you mean by recent?

MR. SHANER: Recent actions, well, they have taken place within the past six weeks.

CHAIRMAN STEIN: Of February.

MR. CHESROW: What are the contaminants you refer to when you say, "Our approach to the stream pollution problem has been one of contaminant elimination."

MR. SHANER: This is eliminating the stream pollution that is going into the Indiana Harbor Canal.

MR. CHESROW: But do you have contaminants in your water?

MR. SHANER: We buy potable water and water for our process from the City of East Chicago.

MR. CHESROW: Yes, and the water that is expended, does it have contaminants?

MR. SHANER: Only the same materials that were originally in the water --

MR. CHESROW: Thank you.

MR. SHANER: -- from the City.

MR. CHESROW: Thank you.

CHAIRMAN STEIN: Thank you very much.

You know, Mr. Klassen and I were discussing how much of this work seems to be done in February.

Mr. Poston, when did you put out that Blue Report of yours?

MR. POSTON: That seems to be in February, too.

MR. KLASSEN: It has nothing to do with it, Mr. Stein. This is the way we do it. You attorneys do not realize it, but February is the time to do things.

CHAIRMAN STEIN: Valentine's Day.

MR. KLASSEN: And George Washington's Day.

CHAIRMAN STEIN: Lincoln's Day.

MR. POOLE: Next, we have Mobil Oil Company. I don't know whether Mr. Keiper is here or Mr. J. W. Mann, the Technical Department Manager.

Mr. Keiper.

MR. KEIPER: Mr. Chairman Stein, conferees, ladies and gentlemen, I am Edgar D. Keiper, Jr., Manager, Mobil Oil Company, East Chicago, Indiana Refinery.

Gentlemen, before I start, inasmuch as you made the remark about February, the date for doing and accomplishing things, I'd like to point out that we have accomplished something which will be discussed here in our presentation in February; however, the inception of such action was back early in 1963.

I have divided my presentation into five sections which include a policy statement, a description of our water antipollution systems, a review of our past antipollution efforts, and a summary of antipollution work which is planned or in progress.

First, concerning our policies and practices, the Mobil Oil Company has always cooperated with Federal, state and local agencies charged with the responsibility of controlling water pollution in matters within the jurisdiction of those agencies. We have long been actively engaged in pollution prevention, and we are fully aware of our legal and moral responsibilities in this matter of water pollution control and abatement. We strive continually to fulfill those responsibilities.

I feel that the survey recently completed by the Public Health Service is most constructive. Their report gives us a rather comprehensive picture of the whole pollution problem in the Chicago area. We feel that those who participated in it have done an excellent and useful job.

Second, regarding waste gathering and waste treatment facilities, the sewer system in the East Chicago Refinery can be divided into five categories: sanitary; oily water; sulfide stripping; non-oily water; and ballast. I'll briefly describe each one.

The sanitary sewer system is completely divorced from any other system. It collects effluent from all sanitary sources such as toilets, wash rooms and shower installations and discharges into the East Chicago Municipal Sanitary Sewer System.

The oily water system consists of gathering facilities which serve all the areas of the plant where the water is likely to be contaminated with oil; for example, the processing units, the transfer pump house, and the like.

The water collected then flows through an API separator and then discharges into the Lake George Branch of the Indiana Harbor Canal. The API separator actually consists of two separators in parallel. Each of the parallel separators has four sections in series which are equipped with oil skimming facilities.

In addition, the primary section is equipped with scrapers for solids removal and the exit section is equipped with hay filters. The design capacity of our API separator system is 4,000 gallons per minute, which is about three times the normal flow. This allows us to shut down each of the parallel systems for maintenance. Moreover, it provides excess capacity which prevents the system from overloading during periods of high rainfall.

Our new sulfide stripper system which went into operation about February 15th, consists of gathering facilities which collect water containing sulfides from the various oil water separators in the processing area and a stripping tower where the water is stripped of sulfides and ammonia. This water is then pumped to the crude oil desalters where 90 percent of the phenols are removed as the crude oil is processed. This treated water then flows from the desalters to the oily water system.

The non-oily system is primarily a surface water drainage unit. It collects drainage from roadways, roofs and the like, places where there is no oil contamination. The net effect of this operation is elimination of a source of oil to the canal.

By that, we mean by not overloading any of the API separators, you get, of course, a more efficient operation of the oily water system.

The ballast system, as the name implies, provides facilities for recovering oil from ballast water discharged by tankers at the refinery's boat dock. Ballast water is pumped into one tank where oil separates from the water by gravity. Accumulated oil is skimmed to a second tank where it is allowed to settle before being pumped to a storage tank for reprocessing.

In addition to these five systems, we also minimize our effluent flow by cooling our process units through closed loop circuits Make-up water to replace losses from evaporation or minor leaks is drawn from the Lake George Branch of the Indiana Harbor Ship Canal.

Regarding historical review of steps taken to prevent pollution, Mobil's East Chicago Refinery, like most refineries these days, has been revamped a number of times since its original construction. During every alteration, the pollution problem was considered, and facilities were installed to cope with it.

In the early 1940's we installed three of the operations I described a moment ago. They were the oily water system, the closed loop cooling system, and the ballast water system. In 1948 a sanitary sewer was installed to dispose of wastes which previously had been treated in septic tanks.

In 1958 the non-oily water system was installed to handle surface water drainage.

The latest addition to our pollution abatement facilities is the sulfide stripper which we placed in operation just last month at a cost of $60,000.

Incidentally, all the systems I've just mentioned were installed at a cost in excess of a million dollars.

Fourth, improvements then to reduce pollution since 1963; in the last 18 months, as part of our continuing program, we have made several notable improvements.

First, though our sulfide stripper has been in operation only a short time, tests to date indicate a reduction of 99-plus percent in sulfides, 45 percent in ammonia and 16 percent in phenols, and we have confidence in the fact that these are conservative numbers; and, of course, we are collecting data every day we operate this facility.

Second, flow through the API separators has been reduced 45 percent through various economies in the use of water and this roughly is a difference between slightly less than 4 million gallons a day down to now about 2 million gallons a day.

Fifth, concerning work planned and in progress, currently, we are making a complete survey of the refinery to first explore ways to eliminate other possible sources of pollution; second, to further reduce the total refinery effluent, and (3) continue to reduce the flow through oily water systems.

Our employees are also becoming more and more aware of pollution problems. They contribute ideas on better ways to operate our process units, waste disposal facilities and offer suggestions with regard to mechanical improvements to further minimize water pollution.

And finally, I'm pleased to report we have a program to continually survey our effluent in cooperation with representatives of the Indiana Stream Pollution Control Board. We are confident that the Indiana and Illinois Pollution Control authorities in cooperation with private industry will be able to solve the problems pointed out in the Public Health Service report.

In summary, we feel that this statement constitutes evidence that Mobil has been progressive in the field of pollution control and abatement. Since the time the survey data was taken, we have improved the quality of our effluent by a reduction of sulfides, ammonia and phenols, as well as oil.

Our continual investigations may reveal other areas where we can make improvements. Finally, let me repeat that we fully understand and welcome our responsibilities as a corporate citizen of East Chicago and of the Chicago area. Our aim is to constantly strive to improve the quality of water discharged from our refinery. This is more than a statement of good intentions -- it is a statement of our actual operating policy.

Thank you.

CHAIRMAN STEIN: Thank you, Mr. Keiper.

Are there any comments or questions?

You know, we have always had a long history, I think, in this field of cooperation with the oil industry.

I remember years ago when we were down in Louisiana -- Mr. Poole was there -- and there was a very dear old Congressman in charge of the district or representing the district who is now deceased; but he was the prototype of what most of us think of as the southern politician. One of the oil representatives whom he got to know fairly well was telling me that he met him in the street and the old gentleman at that time couldn't quite tell whether he was a Federal man or an oil man.

And he went up to him and said, "Congressman, how is that case coming along?"

And the Congressman looked at him and said, "Well, you know, it's very complicated." He said, "Some people are for it and some people are against it, but I can assure you of one thing," he said, "We are making progress."

(Laughter.)

Thank you, Mr. Keiper.

MR. KEIPER: Thank you.

MR. POOLE: For those of you, if any of you are paying attention to your agenda, we are going to pass Calumet Nitrogen Products Company, Director of Technical Services of American Oil Company, Mr. Mallatt will report for both of them at one time.

Next, we have Union Tank Car Company, Mr. R. D. Glick, Plant Engineer.

Union Tank Car? Is Union Tank Car representated in the room?

(No Response.)

Well, then, next on my list is the Sinclair Refining Company, Mr. G. A. Blaine, Plant Manager.

MR. BLAINE: Chairman Stein, conferees, ladies and gentlemen, I'd like to state that on page 20 of the H.E.W. Report, you will find the results of their testing and they compare substantially with our yearly average.

The Sinclair Refining Company's East Chicago Refinery is located on the north bank of the Lake George Branch of the Indiana Harbor Canal, just west of Indianapolis Boulevard.

This refinery has a rated crude capacity of 114,000 barrels per day. Refining facilities include all types of processing generally found in a modern complete petroleum refinery. The present total force at the refinery consists of approximately 1,445 people.

All water for processing and cooling tower make-up purposes is pumped from a Lake Michigan intake located in the vicinity of Indiana Harbor via the 30-inch line to the refinery. All waste water from the refinery is returned to the Indiana Harbor Canal.

Now, some background on our refinery:

The Sinclair East Chicago Refinery began operations in March of 1918 at the rate of approximately 10,000 barrels per day of crude. A single sewer system was constructed to handle all waste water and a gravity-type oil separator of the best design known at the time was installed. This treatment was in accord with the general practice of the day in the refining industry; however, later Sinclair recognized the need for separate treatment of sanitary wastes and constructed a system of sanitary sewers and septic tanks.

This sanitary sewer system served the refinery until 1945 when a completely new refinery sanitary sewer system was built and extended to the refinery boundary where Sinclair took advantage of the opportunity to use the newly expanded City of East Chicago system. Consequently, since 1945, all of our sanitary sewage has been handled through the East Chicago system.

In 1945 the State of Illinois, the City of Chicago, and the Sanitary District of Chicago filed suit in the United States Supreme Court against the State of Indiana, the Cities of Hammond, Gary, East Chicago, Whiting, and 16 industries in Indiana, including Sinclair, alleging the pollution of the south end of Lake Michigan and the impairment of Chicago's water supplies. By this time the Sinclair Refinery had reached a crude capacity of 55,000 barrels per day. The water requirement was approximately 34,000 gallons per minute, consisting of 9,000 gpm from Lake Michigan, and 25,000 gpm from the Indiana Harbor Canal. All of this water, except a small amount lost by evaporation, was returned to the Indiana Harbor Canal.

In the Illinois versus Indiana suit, Sinclair was required to submit to the court a plan for improvement of the waste disposal system. It was evident to Sinclair that any plan submitted to the court should fit into a long range plan which could be adapted to refinery expansion, new processing, and more stringent effluent control requirements.

Therefore, all phases of current operations and future expansion possibilities were given careful consideration before a decision was made. The long range plan finally chosen by Sinclair consisted of the following basic features:

First, maintain a completely separate sanitary sewer and disposal system. This feature of the plan had already been accomplished.

Second, reduction of the overall volume of the effluent to a minimum by the installation of cooling towers for recycling all cooling and condensing water and reduction of process water wherever possible.

Third, construction of an oil-water separator of adequate size for the reduced overall effluent, design specifications for the separator being those recommended by the API Committee on Disposal of Refinery Wastes.

Fourtn, treatment of wastes at their source prior to their entry into the refinery sewer system. This item was of particular importance with the cooling tower system due to the effect of concentration.

The decision to go ahead to build the cooling tower system was basic to the Sinclair Plan since it would have far-reaching effects on all existing and future operations.

Essentially, the decision was a choice between cooling towers and oil-water separators. Either choice called for large expenditures of capital and the choice was complicated by the fact that a large expansion program for the refinery was in the early stages of development. The decision to go the cooling tower route was made primarily on the basis of effluent handling considerations. The Sinclair management recognized the fact that future trends in refinery processing, effluent treatment technology, and government requirements could not be predicted accurately and it was their conviction that the refinery would be able to do a better job with a small effluent than with capable of treating high sulfide spent caustic, oxidizing the sulfides to thiosulfates.

6. Construction of an ammonia-hydrogen sulfide stripper at the Fluid Catalytic Cracking Unit capable of stripping efficiently the sour accumulator waters from that unit.
7. Installation of a ballast tank with necessary facilities for receiving ballast from ships and discharging the water to the oil-water separator after recovery of the separated oil.

The cost of this construction completed prior to 1950 was $2,151,000.

Since 1950, after we had completed our approved projects in conformance with the Illinois and Indiana suit, construction has been added in accordance with the Sinclair Long Range Plan to accommodate new processing units and to further improve the effluent system. This construction consists of:

1. Four additional cooling towers.
2. A new and larger spent caustic treating plant of improved design to convert sulfides to thiosulfates.
3. A new ammonia-hydrogen sulfide stripper at the Catalytic Cracking Unit of greater capacity

and efficiency to strip the sour accumulator waters from that unit; and

Fourth, a larger ballast handling system capable of handling the ballast from all tankers and barges which load and unload at the Sinclair docks. This system has ample capacity for receiving all ballast water pumpings as well as future tank farm storm runoff and holding the water in storage until the oil and water separate. The clear water from this tankage is released to the canal.

Also, certain other oil-water wastes such as ground water from well point and tank farm drain tile installations are handled through the ballast handling system.

The cost of the construction completed since 1950 was $1,530,000, bringing the total construction cost of effluent control facilities to $3,681,000.

As a result of the construction and improved operating procedures accomplished according to the Sinclair Long Range Plan, the total refinery effluent has been reduced from approximately 34,000 gallons per minute, or 45 million gallons a day, to approximately 3,000 gallons per minute, or approximately 4.3 million gallons a day, while the crude run has increased from 55,000 barrels a day to 114,000 barrels a day. The reduction in volume of the effluent is due chiefly to the cooling tower system but also to economy in the use of process water throughout the plant.

Oil in the effluent has been reduced to a relatively low figure. This reduction is attributed largely to the reduction in volume of the effluent. The API separator has ample capacity for this low volume.

Ammonia and sulfides in the effluent have been held to a low figure even though increased crude run and additional processing has increased greatly the amount of these pollutants produced in the refinery. The greatest source of sulfide and ammonia in the refinery is the sour accumulator waters from the catalytic cracking unit. The first stripper for these sour waters was put in operation prior to 1950. The new and more efficient stripper for these waters was put in operation in 1960.

Another important source of sulfide waste is spent caustic which has been used to treat sulfide bearing intermediate and product streams. The first spent caustic treating unit was put in operation prior to 1950. The new and more efficient unit was put in operation in 1962.

The phenol content of the effluent has decreased due to the segregation and sale of high phenolic spent caustic and also due to the processing of stripped accumulator waters over a cooling tower and then through the crude desalters.

Our plans for the future: Sinclair plans for the future are based principally on a continuation of the Long Range Plan as discussed previously in this report. This means, of course, maintaining a minimum-volume effluent with the cooling tower system and treatment of specific wastes at their source. Also, every effort will be made to improve the operation of existing facilities. One item in this category has been approved for an expenditure of $100,000 in 1965. This item calls for construction of two 2,500 barrel tanks especially designed for handling sludges removed from the bottom of the API separator.

With this equipment, we will be able to dispose of the oil-coated solids in the sludge more efficiently and eliminate recycling of any part of these solids back to the separator system. The efficiency of the API separator will be improved and the oil and suspended solids in the effluent will be reduced. The present plans are designed to take care of future expansion and new processing in a manner similar to present operations.

We feel that the reduction in quantity of effluent and improvements in quality which the Sinclair East Chicago Plant has accomplished over the past years is evidence of a sincere effort in attacking the problem and supports the expectation of further improvement to come.

Thank you.

CHAIRMAN STEIN: Thank you very much, sir.

Do you have any questions or comments? If not, thank you very much for your statement.

I think we have again reached the point of diminishing returns and we will reconvene promptly -- and I mean promptly at 9:30 tomorrow.

If it is just Mr. Poole, I and the stenographer here, I'm going to start.

(Whereupon, the Conference in the above--entitled matter was adjourned until March 5, 1965, at 9:30 o'clock a.m.)